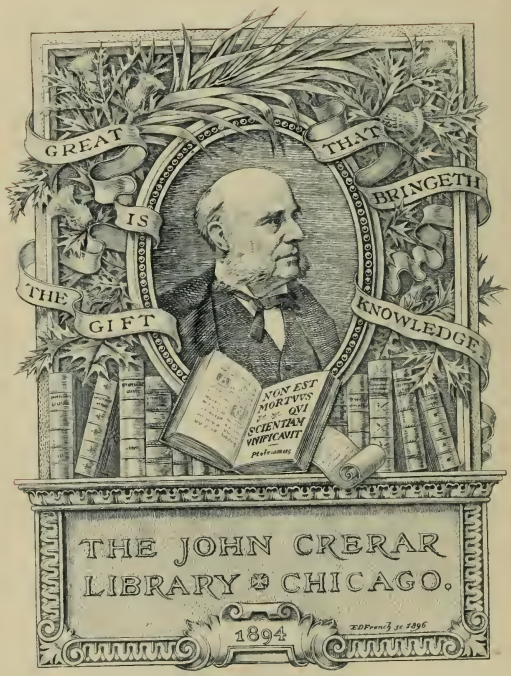

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ANNUAL BULLETIN

—OF—

COLORADO COLLEGE

—AND—

CUTLER ACADEMY

COLORADO SPRINGS, COLORADO

1904

COLORADO SPRINGS.
THE GOWDY-SIMMONS PRINTING CO.
1904

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CALENDAR.

1904.

Feb. 22	Monday	Washington's birthday: a holiday.
Mar. 29	Tuesday	Last day for registering for Hawley and Mary G. Slocum scholarships.
Mar. 30	Wednesday	Easter Recess begins at 1 P. M.
April 7	Thursday	Easter Recess ends at 8:15 A. M.
May 27	Friday	Examinations begin. First Entrance Examinations begin.
May 30	Monday	Memorial Day: a holiday.
June 5	Sunday	Baccalaureate Sermon.
June 6	Monday	Cutler Academy Graduation.
June 7	Tuesday	Class Day.
June 8	Wednesday	Commencement.
Sept. 6	Tuesday	Second Entrance Examinations. Residence Halls open.
Sept. 7	Wednesday	First Half-year begins 8:15 A. M.
Nov. 8	Tuesday	Election Day: a holiday.
Nov. 16	Wednesday	Insignia Day.
Nov. 24	Thursday	Thanksgiving Day: a holiday.
Dec, 16	Friday	Christmas recess begins at 5 P. M.

1905.

Jan. 3	Tuesday	Christmas Recess ends at 8:15 A. M.
Jan. 16	Monday	Mid-year Examinations begin.
Jan. 20	Friday	Trustees' Day.
Jan. 23	Monday	Second Half-year begins at 8:15 A. M.
Jan. 26	Thursday	Day of Prayer for Colleges.
Feb. 22	Wednesday	Washington's Birthday: a holiday.
April 18	Tuesday.	Last day for registering for Hawley and Mary G. Slocum scholarships.
April 19	Wednesday	Easter Recess begins at 1 P. M.
April 27	Thursday	Easter Recess ends at 8:15 A. M.
May 26	Friday	Examinations begin. First Entrance Examinations begin.
May 30	Tuesday	Memorial Day: a holiday.
June 4	Sunday	Baccalaureate Sermon.
June 5	Monday	Cutler Academy Graduation.
June 6	Tuesday	Class Day.
June 7	Wednesday	Commencement.

ANNOUNCEMENT.

Colorado College is the oldest institution of higher education in the State. In 1874, while Colorado was yet a territory, a College upon a broad Christian foundation was established in Colorado Springs. The authorized announcement for that year contains the following:

"It is the purpose of the Trustees to build a College in which liberal studies may be pursued under positive Christian influences. . . The College is under no ecclesiastical or political control. Members of different churches are on its Board of Trustees. . . . The character which is most desired for this College is that of thorough scholarship and fervent piety, each assisting the other, and neither ever offered as a compensation for the defects of the other."

From the beginning the Board of Trustees has been composed of leading professional and business men of Colorado, together with a few Eastern men of similar standing, and has ever been animated by the purpose avowed by the original Board.

A grant of land had been made in advance of the organization of the College, in 1873, by the Colorado Springs Company, the founders of the City of Colorado Springs. The Rev. Jonathan Edwards was the first professor and executive officer. The first President, the Rev. James G. Dougherty, was elected in 1875, and was succeeded in the following year by the Rev. E. P. Tenney. From 1885 to 1888 there was no President, but the work of teaching was carried on without interruption. At this time there was only one building on the campus, Palmer Hall, now known as Cutler Academy, erected in 1880.

In the autumn of 1888 William Frederick Slocum was elected President. The faculty was at once enlarged, the

courses reorganized, and Cutler Academy incorporated as an associated preparatory school, in which students have since been trained, not only for Colorado College, but for all the leading institutions of the United States. Within the following two years $100,000 was given toward endowment, entirely from within the State of Colorado. Hagerman Hall was built in 1889. In the same year the Woman's Educational Society was organized and began the work of building Montgomery Hall. In 1890 the Colorado College Scientific Society was founded, and the first number of its annual publication, "Colorado College Studies," was issued.

Within the past decade the sum of $400,000 has been added to the endowment, and the growth of the College in numbers bas been equalled by an appropriate enlargement of equipment and activity. Among the marks of advance are the Gymnasium, built by the efforts of the students; the Library building, given by the late N. P. Coburn; the Observatory, the gift of Henry R. Wolcott, of Denver; and Ticknor Hall, completed during the closing days of 1897, as a second dwelling house for young women. The entire cost of this beautiful building, exceeding $23,000, was met by Miss Elizabeth Cheney of Wellesley, Mass. In 1900 the Perkins Fine Arts Hall was built at a cost of $30,000. The first floor is an auditorium, used for the religious services of the College and other public meetings; the second story is occupied by the Departments of Fine Arts and Music. Palmer Hall was completed during the fall of 1903 at a cost of $280,000, its equipment costing $50,000 additional. It contains the general offices of administration, recitation rooms, and the laboratories for scientific work in all departments.

At the beginning of this year a School of Engineering

was opened in connection with the College to meet the increasing demand in the Rocky Mountain region for instruction in pure and applied science. The number of engineering students already enrolled has encouraged the Trustees to develop this department to the fullest degree of efficiency.

The growth of the institution in many directions and the steady elevation of its standards of work have won for it an assured position. It is able to offer to its students educational facilities of the same grade as are found at Eastern institutions of the higher learning.

TRUSTEES.

William F. Slocum, *President of the Board*,	24 College Place.
Willis R. Armstrong,	1415 N. Nevada Ave.
George W. Bailey,	309 McPhee Building, Denver.
William P. Bonbright,	1222 N. Cascade Ave.
Rev. Edward H. Braislin, D.D.,	2115 N. Cascade Ave.
John Campbell,	1401 Gilpin St. Denver.
Rev. James B. Gregg, D.D.,	9 E. Dale St.
J. J. Hagerman,	Roswell, New Mexico
Thomas S. Hayden,	1729 Champa St., Denver.
Irving Howbert,	17 N. Weber St.
William S. Jackson,	230 E. Kiowa St.
William Lennox,	1000 N. Nevada Ave.
Horace G. Lunt,	431 N. Cascade Ave.
William J. Palmer,	Out West Building.
George Foster Peabody,	27 Pine St., New York.
Philip B. Stewart,	1228 Wood Ave.
Mahlon D. Thatcher,	Hill Crest, Pueblo.
Frank Trumbull,	1439 Franklin St., Denver.

STANDING COMMITTEES OF THE TRUSTEES.

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INSTRUCTION.

Philip B. Stewart, *Chairman*; Edward H. Braislin, John Campbell, James B. Gregg, Horace G. Lunt.

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William F. Slocum, President.
Edward S. Parsons, Vice-President.
James B. Gregg, Secretary.
George N. Marden, Treasurer.
Nelle Priscilla Sater, Cashier.

BOARD OF CONTROL OF THE N. P. COBURN LIBRARY.

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Secretary—Malcolm G. Wyer.

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Dr. S. E. Solly.
Mrs. Philip B. Stewart.
Rev. A. N. Taft.
Mrs. A. E. Touzalin.
Prof. T. K. Urdahl.

FACULTY.

WILLIAM FREDERICK SLOCUM, A.B., D.D., LL.D. 24 College Place.
President and Head Professor of Philosophy.

*LOUIS A. E. AHLERS, A. B.
Head Professor of Modern Languages and Literatures.

KURNAL R. BABBITT, LL. B. 1412 N. Cascade Ave.
Lecturer on Law.

JOHN AUGUSTUS BETJEMAN, B. S., M. E. Plaza Hotel.
Instructor in Surveying.

ERNEST BREHAUT, A. M. 611 N. Tejon St.
Assistant Professor of Latin.

MARIANNA BROWN, A. M. Hagerman Hall.
Instructor in Latin.

FLORIAN CAJORI, PH.D. 1119 Wood Ave.
Dean of the Engineering School and Head Professor of Mathematics.

THEODORE DRU ALISON COCKERELL 317 E. Yampa.
Curator of the Museum.

CHARLES G. COLLAIS 613 E. Cache La Poudre.
Superintendent of Mechanical Laboratories.

MELVILLE FULLER COOLBAUGH, B. S. 220 E. Cimarron St.
Instructor in Chemistry.

ANNA PEARL COOPER, A. B. 17 N. Wahsatch Ave.
Instructor in English and History.

*Absent on leave 1903--04.

DONALD DEWITT — Hagerman Hall.
Instructor in Public Speaking.

GEORGE IRVING FINLAY, PH. D. — 817 N. Cascade Ave.
Professor of Geology, Mineralogy and Paleontology.

M. CLEMENT GILE, A.M. — 1121 N. Tejon St.
Head Professor of Classical Languages and Literatures and Principal of Cutler Academy.

HENRY C. HALL, A. B., LL. B. — 1401 Wood Ave.
Lecturer on Law.

FREDERIC R. HASTINGS, A. M. — 1122 N. Cascade Ave.
Lecturer on the History of Philosophy.

ELIJAH CLARENCE HILLS, A. B. — 1111 Wood Ave.
Professor of Romance Languages and Literatures.

EDITH PRESTON HUBBARD, A. B. — Montgomery Hall.
Instructor in Mathematics.

ELLSWORTH GAGE LANCASTER, B. D., PH. D. — 1511 N. Nevada Ave.
Assistant Professor of Philosophy and Pedagogy.

*RUTH LOOMIS, A. B. — Ticknor Hall.
Dean of Women.

FRANK HERBERT LOUD, PH. D. — 1203 N. Tejon St.
Professor of Mathematics and Astronomy.

HENRY McALLISTER, JR., B. L. — 1231 N. Nevada Ave.
Lecturer on Law.

EDWARD S. MERRILL, A. B. — 18 E. Monument St.
Athletic Director.

*Absent on leave 1903-04.

HOWARD MOORE, C.E. Plaza Hotel.
Instructor in Drafting and Machine Design.

ATHERTON NOYES, A. B. 10 E. Columbia St.
Assistant Professor of English.

MARION EDWARDS PARK, A. B. Ticknor Hall.
Acting Dean of Women and Instructor in Greek.

EDWARD S. PARSONS, A.M., B.D., LITT.D. 1328 N. Nevada Ave.
Vice-President, Dean, and Bemis Head Professor ot English.

SIDNEY F. PATTISON, A. B. 218 E. Dale St.
Assistant Professor of English.

EDWARD C. SCHNEIDER, PH. D. McGregor Hall.
Professor of Biology.

JOHN CUTLER SHEDD, PH. D. 1103 Wood Ave.
Professor of Physics.

*HUGH ALLISON SMITH, A. M. 827 N. Custer Ave.
Professor of French Language and Literature.

WILLIAM STRIEBY, A.M., E.M. 805 N. Cascade Ave.
Professor of Chemistry and Metallurgy.

WILLIAM C. STURGIS, PH. D. 6 Pelham Place.
Lecturer on Botany.

MAUD EMILIE TAFT, M. D. McGregor Hall.
Medical Adviser for Women.

THOMAS K. URDAHL, PH. D. 1107 Wood Ave.
Professor of Political and Social Science.

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* Absent on leave, 1904-05.

CHARLES F. WOODS, PH. D. Hagerman Hall.

Assistant Professor of German.

MALCOLM G. WYER, M. L., B. L. S. 18 E. Monument St.

Librarian.

ARTUS VAN BRIGGLE. 1712 N. Nevada Ave.

Critic in Art.

Cinti Art Academy, '87--'93; Duveneck School of Painting. '91--92; Student Colarrossi School, '93--96; pupil of Jean Paul Laurens and Benjamin Constant, Julians, Paris, '93--'96· Colorado College, '03.

CLARENCE WILBER BOWERS. 1005 N. Wahsatch Ave.

Instructor in Piano-forte, Organ, Harmony and Counterpoint.

Graduate, New England Conservatory of Music, Boston; Pupil of G. W. Chadwick and Ferruccio Busoni, '90--'92; Pupil of Alexandre Guilmant, Paris, '95--'96; Organist and Instructor in Music in Seminary and Academy, Andover, Mass., '91--'92; Professor of Instrumental Music and Harmony, Cornell College, Mt. Vernon, Iowa, '92--'95; Colorado College, '96.

MRS. ROBERT BRISCOE. 801 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95: Colorado College, '00.

MRS. MAUD S. FAUST. 114 E. Monument St.

Instructor in Piano-forte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

SAMUEL JESSOP. 208 E. Dale St.

Instructor in Voice Culture.

Honor Certificate, Royal Academy of Music, '84; Organist and Choirmaster, Dartford Parish Church, London, '91--'01; Colorado College, '02.

ROBERT W. STEVENS. 1430 Tremont St., Denver.

Instructor in Piano-forte.

Instructor in Piano, Chicago Conservatory of Music, '93-'03: Pupil of Godowsky and of Madame Fanny Bloomfield Zeisler; Colorado College, '03.

STANDING COMMITTEES OF THE FACULTY.

ACCREDITED SCHOOLS.

Professor Lancaster, *Chairman;* Professors Gile, Strieby.

ART.

Mr. Van Briggle, *Chairman;* Miss Park, Mr. Moore.

ATHLETICS.

Professor Smith, *Chairman;* Professors Cajori, Noyes, Mr. Merrill.

COURSES OF STUDY OF INDIVIDUAL STUDENTS.

Professor Parsons, *Chairman;* Professors Noyes, Finlay, Miss Park.

DISCIPLINE.

COLLEGE—The President, *Chairman;* Professors Parsons, Cajori, Gile, Schneider.

ACADEMY—Professor Gile, *Chairman;* Professors Pattison, Brehaut, Miss Brown.

MUSIC.

Professor Parsons, *Chairman;* Mr. Jessop, Mrs. Faust, Miss Cooper.

POST-GRADUATE DEGREES.

Professor Lancaster, *Chairman;* Professors Urdahl, Finlay.

PUBLICITY.

Professor Hills, *Chairman;* Professors Noyes, Lancaster, Smith, Brehaut, Mr. Betjeman.

SCHEDULE.

Professor Shedd, *Chairman;* Professors Loud, Noyes, Strieby.

PUBLICATIONS.

Professor Brehaut, *Chairman;* Professor Pattison, Mr. Betjeman, Mr. Woods.

SCHOLARSHIPS.

The President, *Chairman;* Professors Parsons, Gile, Miss Park, Miss Brown.

STUDENTS' SELF-HELP.

Professor Lancaster, *Chairman;* Professor Smith, Mr. Collais.

ENGINEERING.

Professor Cajori, *Chairman;* Mr. Betjeman, Mr. Moore.

CLASS OFFICERS.

COLLEGE.	ACADEMY.
Seniors—The President.	IV—Miss Cooper.
Juniors—Prof. Lancaster.	III—Mr. Coolbaugh.
Sophomores—Prof. Brehaut.	II Miss Brown.
Freshmen Prof. Hills.	I—Miss Hubbard.
Special Students—Prof. Noyes.	

ADMISSION.

REGISTRATION.

Before registering, each candidate must present to the Dean a certificate of moral character signed by some responsible person in the community in which he has made his home. Students are required to register promptly and attend the first exercises in their courses.

ENTRANCE REQUIREMENTS.

1. ENGLISH, 3 units.*
2. HISTORY, 1 unit.
3. MATHEMATICS, 2 units (preferably 3).
4. LATIN, GERMAN, OR FRENCH, 4 units, of which 2 must be Latin.
5. SCIENCE, 2 units (to be selected from the list of sciences given below in 6; but the student is advised to offer Chemistry and Physics. If the student offers Greek, only one unit of Science is required).
6. ELECTIVES, sufficient to make a total of 16 units.

   Greek, 3 units.
   German, 1 or 2 units.
   French, 1 or 2 units.
   Spanish, 1 or 2 units.
   Mathematics, 1 unit.
   History, 1 unit.
   Chemistry, 1 unit.
   Physics, 1 unit.
   Physiology, ½ unit.
   Zoology, ½ unit.
   Botany, ½ unit.
   Physiography, ½ unit.
   Geology, ½ unit.
   Mechanical Drawing, 1 unit.

*A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 45 minutes each a week.

UNIT COURSES IN PARTICULAR SUBJECTS.

1. ENGLISH—(3 units).

(*a.*) A practical knowledge of grammar and the elements of rhetoric.

(*b.*) A thorough study of the subject matter and style of the following works: Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison.

(*c.*) A careful but not minute study of the following works, sufficient to give the candidate a clear idea of their important parts: Shakespeare's The Merchant of Venice and Julius Cæsar; The Sir Roger de Coverley Papers in the Spectator; Goldsmith's Vicar of Wakefield; Coleridge's Ancient Mariner; Scott's Ivanhoe; Carlyle's Essay on Burns; Tennyson's The Princess; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

2. HISTORY—(1 unit). An outline knowledge of the leading facts of either Ancient, Greek and Roman, Mediæval and Modern, American, or English history.

(*a.*) Ancient History: Myers and Botsford, Myers, West, or an equivalent.

(*b.*) Greek and Roman: Botsford, Allen, or an equivalent.

(*c.*) Mediæval and Modern: Myers, or an equivalent.

(*d.*) American: Channing, McLaughlin, Thomas, Johnston, Montgomery, or an equivalent.

(*e.*) English: Larned, Coman and Kendall, Montgomery, or an equivalent.

3. MATHEMATICS—(2 units; preferably 3).

(*a.*) Algebra, through simultaneous quadratic equations.

(*b.*) Elementary Plane Geometry: the first five books of Phillips and Fisher's, Wells', or Wentworth's Geometry, or an equivalent.

(*c.*) Solid and Spherical Geometry.

(*d.*) Plane Trigonometry.

4. LATIN—(*a.*) An accurate and ready knowledge of grammatical forms. Caesar: Gallic War, Bks. I-IV, or an equivalent. Prose Composition: Daniell, or Moulton and Collar. (2 units.)

(*b.*) Cicero: seven orations. Translation at sight of easy passages of prose. Prose Composition (1 unit.)

(*c.*) Vergil: Aeneid, Bks. I-VI. Prose Composition (1 unit.)

5. GREEK—(3 units). (*a.*) A thorough knowledge of grammar and accentuation.

(*b.*) Four books of the Anabasis.

(*c.*) Three books of the Iliad, with prosody and dialectic forms.

(*d.*) Translation at sight of average passages from Xenophon and Homer.

(*e.*) The translation into Greek of a passage of connected discourse (Collar and Daniell's Greek Prose Composition, or an equivalent).

6. GERMAN, FRENCH AND SPANISH—A third and a fourth year of German or French will be accepted as an elective entrance subject if the work has been done satisfactorily. Candidates for admission to Colorado College are advised to present two units of German, French or Spanish, as preparatory to admission to the German B., French B., or Spanish B., given in the College.

(*a.*) The work of the first year should comprise: (1) Careful drill in pronunciation; (2) the memorizing

and frequent repetition of easy colloquial sentences; (3) drill in the rudiments of grammar; (4) abundant easy exercises; (5) the reading in graduated texts of from 75 to 100 pages of German, or from 100 to 175 pages of French or Spanish.

(*b.*) The work of the second year should comprise: (1) the careful reading of from 150 to 200 pages of German literature, or from 250 to 400 pages of French or Spanish literature, in the form of easy stories or historical or biographical sketches; (2) accompanying practice, as before, in the translating from English of easy variations from the matter read, and also in off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill in the rudiments of grammar.

A good selection of texts for the second year, arranged in suitable order for reading, would be: *German:* (1) Andersen's *Maerchen* or *Bilderbuch*, or Leander's *Traeumereien*, to the extent of about forty pages; (2) Hauff's *Das kalte Herz*, or Zschokke's *Der zerbrochene Krug;* (3) Hillern's *Hoeher als die Kirche*, or Storm's *Immensee;* (4) one of the following stories: Baumbach's *Die Nonna*, *Der Schwiegersohn*, Heyse's *L'Arrabiata*, *Das Maedchen von Treppi*, *Anfang und Ende*, Jensen's *Die Braune Erica* Seidel's *Maerchen;* (5) one of the following plays: Benedix' *Der Prozess*, *Der Weiberfeind*, *Guenstige Vorzeichen*, Elz' *Er ist nicht eifersuechtig*, Wichert's *An der Majorsecke*, Wilhelmi's *Einer muss Heiraten*. *French:* (1) Mairet's *La tache du petit Pierre*, Malot's *Sans famille*, or Bruno's *Le tour de la France;* (2) Labiche and Martin's *Le voyage de M. Perrichon*, or Halevy's *L'Abbe Constantin;* (3) Dumas' *La tulipe noire*, or Erckmann-Chatrian's *Madame Therese;* (4) Sarcey's *Le siege de Paris*, or Lamartine's *Jeanne d'Arc;* (5) Vigny's *La Canne de Jonc* or Daudet's *Short Tales*. *Spanish:* (1) Valera's *El Pajaro verde* and Alarcon's *El Capitan Veneno* or about 100 pages of Padre Isla's version of *Gil Blas;* 2) Galdos' *Dona Perfecta* or *Marianela;* (3) Echegaray's *O locura o santidad*, or Carrion and Aza's *Zaragueta*.

7. PHYSICS—(1 unit). Not less than two hours a week of recitation, and four of laboratory work; Carhart and Chute's Element's of Physics, Wentworth and Hill's Text-Book of Physics, or an equivalent.

8. CHEMISTRY—(1 unit). Williams' Elements of Chemistry, or an equivalent.

9. BOTANY—(½ unit). Bergen's Elements of Botany, Coulter's Plant Studies, or an equivalent.

10. PHYSIOLOGY—(½ unit). Blaisdell's Practical Physiology, or an equivalent.

11. ZOOLOGY—(½ unit). Kellogg, Jordan, Davenport, or an equivalent.

12. PHYSIOGRAPHY—(½ unit). Tarr, Davis, Dryer, or an equivalent.

13. GEOLOGY—(½ unit). Scott's Introduction to Geology, or an equivalent.

14. MECHANICAL DRAWING—(1 unit).

ADMISSION BY CERTIFICATE.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to any one of the above named groups, will be admitted without condition into the Freshman Class in the corresponding course. Each candidate must bring from his principal a personal statement as to his grade of scholarship.

Accredited Schools.

The following schools are on the accredited list; certificates of the satisfactory completion, in any of them, of any branch in the course of study required for admission to the College, will be accepted in lieu of examination.

Aspen High School.
Canon City High School.
Canon City So. Side High School.
Central City High School.
Cheyenne (Wyo.) High School.
Colorado Springs High School.
Cripple Creek High School.
Delta High School.
Denver: High School, Dist. No. 1.
" High School, Dist. No. 2.
" High School, Dist. No. 7.
" High School, Dist. No. 17.
" Manual Training High School.
Douglas Co. H. S., Castle Rock.
Durango High School.
Florence High School.
Fort Collins High School.
Fort Morgan High School.
Georgetown High School.
Golden High School.
Wolfe Hall, Denver.
Gordon Academy, Salt Lake City.
Grand Junction High School.
Greeley High School.
Idaho Springs High School.
Jarvis Hall, Montclair.
Leadville High School.
Longmont High School.
Loveland High School.
Manitou High School.
Monte Vista High School.
Otero Co. High School, La Junta.
Ouray High School.
Pueblo High School, Dist. No. 1.
" High School, Dist. No. 20.
Salida Academy.
Salida High School.
Telluride High School.
Trinidad High School.
Victor High School.
Walsenberg High School.
Wheat Ridge High School, Alcott.
Miss Wolcott's School, Denver.

ADMISSION BY EXAMINATION.

Candidates for admission to the Freshman Class, unless admitted by certificate (see above), must pass examinations in the requirements indicated above (p. 16). Such examinations will be held in Palmer Hall on Tuesday and Wednesday, May 31 and June 1, 1904, and again on Tuesday, September 6, 1904. No examination will be held between these dates, but delayed examinations may be held after the beginning of the fall term for the accommodation of students who, for good reason, have been unable to attend at the regular time.

For the accommodation of students residing at a distance, examinations will be held under the direction of authorized persons at various points in and near the State,

as need may require. The cities of Cheyenne, Denver, Pueblo, Trinidad, Leadville, Montrose, Grand Junction, and Las Vegas, are points where such arrangements can readily be made, and others may be added, if necessary. But students who desire examinations at these or other points must notify the President at least three weeks in advance of the time of the regular examination.

ADMISSION TO ADVANCED STANDING.

Students will be received into advanced classes on examination in the studies of the preceding year. The Faculty may, at their discretion, receive certificates from other colleges as evidence that the student has satisfactorily pursued those or equivalent studies.

COURSES OF STUDY.

In the College, beginning with 1906, only one degree will be given, that of Bachelor of Arts. To secure this degree the student will be required to complete a course of study consisting of (1) certain prescribed studies, (2) a specified number of hours in a major subject, (3) enough free electives to bring his work up to the total requirement of 60 hours, making an average of 15 hours per week throughout the four years.

PRESCRIBED STUDIES.*

FRESHMAN YEAR..Mathematics, A (1), A (2), A (3), 4 hours.

English B., 3 hours.

And one of the following groups:

1. Greek, Latin, and German or French.
2. Greek, German or French, and Science.
3. Latin, German or French, and Science.
4. German, French, and Science.

*Unless otherwise stated, each course continues through the year.

Each subject in the above four groups comes three times a week. The course in Science must be Chemistry, Physics, or Biology. If the student does not elect Science in the Freshman year, he must take it in the Sophomore year.

SOPHOMORE YEAR..	English C. and D., 3 hours.
	History, 2 hours.
	Public Speaking A.
JUNIOR YEAR.....	Philosophy A (Psychology), 3 hours.
	Economics A., first half-year, 2 hours.
SENIOR YEAR.....	Philosophy C. and D., 4 hours.

MAJOR SUBJECT.

In addition to the above prescribed subjects, each student shall select a *major* subject, or specialty, if possible before the end of the Sophomore year, and, in any case, not later than the beginning of the Junior year. The professor in charge of the *major* subject will act as the student's adviser, and will have authority, with the Dean, to require the completion of work amounting to fifteen (15) hours in the *major* subject, or in the *major* subject and in such minor subjects as he shall consider necessary, or collateral, work. Mention of the *major* subject will be made in the diploma.

Any one of the following may be selected by the student as his *major* subject: (1) Philosophy; (2) Greek; (3) Latin; (4) English; (5) German; (6) French; (7) Spanish and Italian; (8) Economics and Political Science; (9) History; (10) Mathematics; (11) Astronomy; (12) Physics; (13) Chemistry; (14) Biology; (15) Geology.

English B. and C., and Mathematics A. cannot be counted as part of the requisite fifteen (15) hours.

Petitions to change the *major* subject will be granted only when approved by the professors in charge of both the old and the new subjects, and when granted, the student

will be held to all the requirements of the new *major* subject. In no case can the *major* subject be changed later than the beginning of the Senior year.

ELECTIVES.

The student shall elect from the list given below, in addition to the prescribed subjects and the *major* subject, a sufficient number of courses to bring the total amount of his College work up to sixty (60) hours. Of the following list of electives, not all will be given in any one year. Each continues through the year, unless it is otherwise stated.

	HOURS PER WEEK.
PHILOSOPHY.—(p. 29.)	
B. *Psychological Laboratory*	1
E. *Modern German Philosophy;* first half-year	2
F. *The Philosophical Movement in England;* second half-year	2
G. *Advanced Logic;* second half-year	2
H. *Lotze;* second half-year	2
I. *Seminary in Social Ethics;* second half-year	1
J. *Seminary in Greek Philosophy;* one half-year	1
K. *Evolution of Religious Thought;* second half-year	2
PEDAGOGY.—(p. 31.)	
A. *History and Philosophy of Education;* first half year	3
B. *School Hygiene and Child Study;* second half-year	3
C. *Original Observations*	1
GREEK.—(p. 31.)	
A. *Selections from Homer, Plato and Herodotus*	3
B. *Drama*	3
C. *History;* one half-year	3
D. *Philosophy*; one half-year	3
E. *Epic and Lyric Poetry;* one-half year	3
F. *Course for Teachers;* one half-year	3
LATIN.—(p. 32.)	
A. *Course for Freshmen*	3
B. *Course for Sophomores*	3
C. *Drama;* one half-year	3

LATIN—*Continued.*

D. *Catullus and the Elegiac Poets;* one half-year..... 3
E. *Satire;* one half-year..... 3
F. *Roman Life*..... 3
G. *Vergil;* one half-year..... 3
H. *Course for Teachers;* one half-year..... 3

ENGLISH.—(p. 32.)

E. *Early English Literature;* first half-year..... 3
F. *Middle English;* second half-year..... 3
G. *Chaucer and Spenser;* first half-year..... 3
H. *English Drama:* first half-year..... 3
I. *Shakespeare;* second half-year..... 3
J. *Shakespeare*..... 2
K. *Milton;* first half-year..... 3
L. *English Poetry from Dryden to Burns;* first half-year..... 3
M. *Keats*, *Shelley*, *Byron*, *Coleridge*, *Wordsworth;* second half-year..... 3
N. *Tennyson and Browning;* first half-year..... 3
O. *Modern English Prose;* second half-year..... 3
P. *Old English*; first half-year..... 3
Q. *Béowulf*, second half-year..... 3
R. *Lyrics*; second half-year..... 2
S. *Outline History of English Literature;* first half-year.... 3
T. *Advanced Composition;* second half-year..... 2
U. *English Novelists of the Nineteenth Century;* first half-year..... 3
V. *Greek Drama for English Readers;* second half-year..... 3

PUBLIC SPEAKING.—(p. 34.)

B. *Oratory*..... 2
C. *Forensics*; one half-year..... 3
D. *Extempore Speaking*..... 1

GERMAN.—(p. 34.)

A. *Elementary Course*..... 3
B. *Intermediate Course*..... 3
C. *Schiller and Goethe;* first half-year..... 2
D. *Lessing and Goethe;* second half-year..... 2
E. *History of German Literature*..... 1
F. *The Nibelungenlied*..... 2
G. *Middle High German;* one half-year..... 3

GERMAN—*Continued.*

H. *Gothic* 2
I. *Faust* 2
K. *Poetry of Goethe and Schiller* 2
L. *Scientific German* 2
M. *Colloquial German* 1

FRENCH.—(p. 36.)

A. *Elementary Course* 3
B. *Intermediate Course* 3
C. *Classic Period;* first half-year 2
D. *Nineteenth Century Drama;* second half-year 2
E. *Molière* 2
F. *Critical Study of Classic Authors;* first half-year 2
G. *Lyric Poetry;* second half-year 2
H. *Old French* 2
I. *Conversation* 1

SPANISH.—(p. 37.)

A. *Elementary Course* 3
B. *Modern Spanish Literature* 2
C. *Literature of the Sixteenth and Seventeenth Centuries* 2

ITALIAN.—(p. 37.)

A. *Elementary Course* 2
B. *Literature of Thirteenth and Fourteenth Centuries* 2

ECONOMICS.—(p. 38.)

B. *Charities and Corrections;* second half-year 3
C. *Money and Banking;* first half-year 3
D. *Socialism;* first half-year 3
E. *Colonial Policy*; second half-year 2
F. *Economic and Social History of the United States* 2
G. *Public Finance*; second half-year 3
H. *History of Economic Theory;* second half-year 3
I. *Economic Geography;* first half-year 2

POLITICAL SCIENCE.—(p. 39.)

A. *Historical Politics;* first half-year 3
B. *Comparative Politics;* second half-year 3
C. *Elementary Law;* first half-year 3
D. *American Constitutional Law;* second half-year 2

POLITICAL SCIENCE—*Continued.*

E. *International Law;* second half-year 2
F. *Contracts* 3

HISTORY (p. 40.)

A. *English* 2
B. *American;* { first half-year 2
second half-year 2
C. *The Napoleonic Era and Modern Times;* second half year 2
D. *Modern European History;* second half-year 2
E. *Mediaeval History;* first half-year 2
F. *Roman History;* second half-year 2

MATHEMATICS.—(p. 40.)

B. (*1.*) *Analytical Geometry* (elementary); first half year 3
B. (*2.*) *Analytical Geometry* (more advanced); second half-year 2
C. *Calculus, Differential and Integral;* { first half-year 3
second half-year. 4
D. *History and Logic of Mathematics;* one half-year 2
E. *Modern Methods in Geometry;* one half-year 3
F. *Theory of Equations;* one half-year 3
H. *Determinants;* one half-year 2
I. *Elementary Surveying;* second half-year 3
J. *Theoretical Mechanics* 4

ASTRONOMY.—(p. 41.)

A. *Elementary Astronomy;* second half-year 3
B. *Observations and Computations;* first half-year 3
C. *Celestial Mechanics* 2
D. *Elementary Meteorology;* second half-year 3

PHYSICS.—(p. 42.)

A. *General Physics* 3
B. *General Physics* 4
C. (*1.*) *Theoretical Physics* 2
C. (*2.*) *Theoretical Physics* (advanced) 2
D. *Practical Physics* 1
E. *Lectures on Advanced Physics* 1
F. *Seminary* 1
G. *Problem Work;* second half-year 2

CHEMISTRY.—(p. 43.)

A.	*Elementary Chemistry*	3
B.	*Advanced Chemistry*	3
C.	*Qualitative Analysis*	4
D.	*Quantitative Analysis*	4
E.	*Organic Chemistry*	3
F.	*Theoretical Chemistry*	3
G.	*Medical Chemistry*	3

BIOLOGY.—(p. 45.)

A.	*General Biology*	3
B.	*Zoology*	3
C.	*Physiology*	3
D.	*Comparative Anatomy of Vertebrates;* first half-year	3
E.	*Mammalian Anatomy;* second half-year	3
F.	*Histology;* first half-year	3
G.	*Embryology and Cytology*	3
H.	*Bacteriology*	2
I.	*Sanitary Science and Public Health*	1
J.	*Plant Histology;* first half-year	3
K.	*Plant Physiology;* second half year	3

GEOLOGY.—(p. 46.)

A.	*General Geology*	3
B.	*Mineralogy*	3
E.	*Economic Geology*	3
F.	*Invertebrate Paleontology;* first half-year	3
G.	*Vertebrate Paleontology;* second half year	3
H.	*Petrography*; first half-year	3
I.	*Field Geology.*	

BIBLE STUDY.—(p. 48.)

The Life of Christ	1

MUSIC.—(p. 48.)

*Harmony**	2
*Counterpoint**	2
*Composition**	2

*For the courses in Music an additional tuition will be charged. (See p. 48.)

DEPARTMENTS OF INSTRUCTION.

PHILOSOPHY.

PRESIDENT SLOCUM, ASSISTANT PROFESSOR LANCASTER.

The required work in this department extends over the whole of the Junior and Senior years, and gives the student a knowledge of the development of thought in the several departments of philosophy. The various Seminary courses afford training in the study and discussion of important psychological, sociological and ethical questions.

A. *Psychology.*—3 hours.—PROFESSOR LANCASTER.

1. *Neurology.*—Lectures on the brain and nervous system with careful dissections, by the class, of brains of animals, and study of the human brain. 8 weeks.

2. *Animal Intelligence.*—Lectures, reading of Romanes, Morgan, Binet and others. A study of comparative neurology of animals, with a thesis by each member of the class on the nervous development of some species of animals, compared with the habits and environment of the same animal. 6 weeks.

3. *Experimental Psychology.*—Introductory lectures and experiments showing the general relation between Sensation, Perception and Apperception. 4 weeks.

4. *General Psychology and Logic.*—Calkins' *Introduction to Psychology;* recitations, lectures, parallel readings and observations. Jevons' *Elementary Lessons in Logic.* Second half-year.

5. *Psychological Seminary.*—The leading subjects in Modern Psychology. Theses and Discussions.

B. *Laboratory Course in Advanced Psychology.*—Physiological and Experimental Psychology, including Sensation, Reflex Action, Fatigue, Attention, Memory, Emotion, Association, Temperament, etc. 2 hours.—PROFESSOR LANCASTER.

C. *History of Philosophy.*—First half-year, 4 hours.—PRESIDENT SLOCUM.

1. *Lectures, Recitations and Conferences.*—3 hours.
   (*a.*) Study in Comparative Religions.
   (*b.*) Greek Philosophy. 20 lectures.
   (*c.*) Modern Philosophy. 15 lectures. (1) The Rise and Fall of Scholasticism; (2) The Beginnings of Modern Philosophy—Bacon and Descartes; (3) Spinoza; (4) Locke; (5) The Sceptical Movement in France; (6) Leibnitz; (7) Berkeley; (8) Hume; (9) Kant, The Critique of Pure Reason; (11) Kant, The Transcendent Element in his Philosophy; (12) Hegel; (13) Schopenhauer; (14) Lotze; (15) Spencer—The Philosophy of Evolution.

2. *Metaphysical Seminary.*—1 hour.
   Presentation of papers and discussion of the following subjects:
   (*a.*) The Great Religions of the World.
   (*b.*) The Psychological Basis of Religious Faith.
   (*c.*) The Psychological Basis of Æsthetics.
   (*d.*) Philosophical Thought in England during the Nineteenth Century.
   (*e.*) Evolution: Its History, Development and Results.

D. *Ethics.*—Second half-year, 4 hours.—PRESIDENT SLOCUM.

1. *Janet's Theory of Morals.*—Lectures, theses and discussions. 3 hours.
   (*a.*) The Fundamental Principals of Ethics. 12 lectures.
   (*b.*) Christian Ethics. 3 lectures.

2. *Ethical Seminary.*—1 hour.
   Presentation of papers and discussions upon the following subjects:
   (*a.*) Modern Social and Sociological Problems.
   (*b.*) The Ethical View of Citizenship.
   (*c.*) A study of Educational Theories from an Ethical Standpoint.

E. *Modern German Philosophy.*—First half of Senior year, 2 hours.—PRESIDENT SLOCUM.

F. *The Philosophical Movement in England.*—Second half of Senior year, 2 hours.—PRESIDENT SLOCUM.

G. *Advanced Logic.*—Second half-year, 2 hours—PRESIDENT SLOCUM.

H. *Lotze.* Second half-year, 2 hours.—PRESIDENT SLOCUM.

I. *Seminary in Social Ethics.*—The Labor Question, Temperance, Pauperism and other social problems considered from an ethical standpoint. Second half-year, 1 hour.

J. *Seminary in Greek Philosophy.*—One half-year, 1 hour.

K. *Evolution of Religious Thought.*—Second half-year, 2 hours.—MR. HASTINGS.

PEDAGOGY.

ASSISTANT PROFESSOR LANCASTER.

A. *History and Philosophy of Education.*—The recent educational developments in Europe and America. Study of educational reformers, school systems and curricula. Lectures, reading and seminary reports of research work. First half-year, 3 hours.

B. *School Hygiene and Child Study.*—Hygiene of the senses, fatigue, child and adolescent psychology, problems of the school room and of practical teaching. Lectures, reading and seminary. Second half-year, 3 hours.

C. *Original Observations in Psychological and Pedagogical Fields of Study.*—1 hour.

GREEK.*

PROFESSOR GILE, ASSISTANT PROFESSOR BREHAUT AND MISS PARK.

A. Homer, selections from the *Odyssey* and *Iliad* in the original and all the poems in translation; Plato, *Apology* and *Crito;* Herodotus, selections.—3 hours.

B. *Greek Drama.*—Æschylus, *The Septem* and *Prometheus;* Sophocles, *Antigone;* the remainder of Æschylus' and Sophocles' plays in translation; Euripides, *Alcestis* and *Medea.*—3 hours.

C. *Greek History.*—(*a.*) Herodotus; careful study of the period of the Persian Wars. Reading from the dramatists for further illustration of the life of the period; or, (*b.*) Thucydides, the Sicilian Expedition. Parallel readings in Curtius, Grote and other modern historians. Selections from Plutarch's Lives. One half-year, 3 hours.

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*Students who enter without Greek, are permitted to take as College work, Academy courses in Greek. (See Cutler Academy.)

D. *Greek Philosophy.*—Plato. *Phaedo.* Selections from other dialogues, and from the works of Xenophon. Zeller's *Socrates and the Socratic Schools.* One-half-year, 3 hours.

E. *Greek Epic and Lyric Poetry.*—Homer, Hesiod and Pindar. One half-year, 3 hours.

F. *A Course Designed for Teachers.*—Selections from Xenophon; composition; careful grammatical study. One half-year, 3 hours.

NOTE.—For a course in Greek Drama for English readers, see English V. (p.34).

LATIN.

PROFESSOR GILE, ASSISTANT PROFESSOR BREHAUT AND MISS PARK.

A. Livy, Selections from Books XXI and XXII; Cicero, *De Senectute, De Amicitia;* Horace, *Odes.*—3 hours.

B. Horace, Selections from the *Epistles* and *Satires;* Tacitus, *Germania* and *Agricola;* Terence, *Phormio;* Plautus, *Captivi;* Cicero, *Selected Letters.*—3 hours.

C. *Drama.*—Selected plays of Plautus and Terence; history and characteristics of the Roman Drama. One half-year, 3 hours.

D. *Catullus and the Elegiac Poets.*—One half-year, 3 hours.

E. *Satire.*—History and characteristics of Roman Satire. Selections from Horace, Persius, Juvenal. Parallel readings in English Literature. One half-year, 3 hours.

F. *Roman Life.*—Manners, morals, politics and religion under the late Republic and the Empire. Cicero, *Selected Letters;* Petronius, *Cena;* Pliny, *Selected Letters;* Martial, *Selected Epigrams;* reports on special topics.—3 hours.

G. *Vergil.—The Aeneid,* Books VII-XII; the *Bucolics,* and Selections from the *Georgics.* One-half-year, 3 hours.

H. *A course designed for Teachers.*—Selections from Cæsar and Cicero; composition; careful grammatical study. One half-year, 3 hours.

ENGLISH.

PROFESSOR PARSONS, ASSISTANT PROFESSORS NOYES AND PATTISON.

B. *Rhetoric and Composition.*—Elementary course. 3 hours.

C. *Forms of Composition.*—Prerequisite, Course B. First half-year, 3 hours.

T. *Advanced Composition.*—Prerequisite, Course C. Second half-year, 2 hours.

D. *American Literature.*—Irving, Cooper, Poe, Bryant, Hawthorne, Longfellow, Emerson, Lowell, Holmes, Whittier. Second half-year, 3 hours.

S. *Outline History of English Literature.*—First half-year, 3 hours.

E. *Early English Literature.*—A rapid survey, from the Anglo-Saxon Conquest to Chaucer. First half-year, 3 hours.

F. *Middle English.*—A study of the development of the English language and literature in the twelfth and thirteenth centuries. Second half-year, 3 hours.

G. *Chaucer and Spenser.*—The principal poems read critically in class. Life and thought of the times. First half-year, 3 hours.

H. *The English Drama: Through Marlowe.*—Principles and development. Given in alternate years: 1903-1904; 1905-1906. First half year, 3 hours.

I. *The English Drama: Shakespeare.*—The principal plays read chronologically. Second half-year, 3 hours.

J. *Shakespeare.*—A critical text study of three dramas of Shakespeare. The class meets once a week for a two-period session. PROFESSOR AHLERS.

K. *Milton.*—A comprehensive study of the poet's personality and work. First half-year, 3 hours.

L. *English Poetry from Dryden to Burns.*—First half-year, 3 hours.

M. *Keats, Shelley, Byron, Coleridge, Wordsworth.*—Second half-year, 3 hours.

N. *Tennyson and Browning.*—First half-year, 3 hours.

O. *Modern English Prose.*—Dryden to Ruskin. Second half-year, 3 hours.

P. *Old English.*—The beginnings of English Literature. Reading is begun at once and the study is made as literary in character as possible. First half-year, 3 hours.

Q. *Old English.*—Béowulf. Prerequisite, Course P. Second half-year, 3 hours.

R. *Lyrics.*—Second half-year, 2 hours.

U. *English Novelists of the Nineteenth Century.*—Jane Austen, Scott, Dickens, Thackeray, George Eliot, Stevenson. First half-year, 3 hours.

V. *Greek Drama for English Readers.*—Literary study of Aeschylus and Sophocles in poetic translation; lectures on the Greek Theatre and on Greek Art. Second half-year. 3 hours.

PUBLIC SPEAKING.

MR. DEWITT.

A. *Declamation.*—One declamation to be prepared and delivered in each half-year. Private rehearsals and occasional meetings of the class. Required of all Sophomores.

B. *Oratory.*—An analytical study of the speeches of noted orators; the memorizing and delivery of selections; the study of contemporary orators; the preparation and delivery of two orations. 2 hours.

C. *Forensics.*—The nature of evidence, argumentation, brief drawing, and the delivery of argument. One half-year, 3 hours.

D. *Extempore Speaking.*—Current topics are discussed. A brief speech is required each week with a view to general efficiency in public speaking. 1 hour.

GERMAN LANGUAGE AND LITERATURE.†

PROFESSOR AHLERS, AND ASSISTANT PROFESSOR WOODS.

A. *Elementary Course.*—Joynes-Meissner's *Grammar.* Andersen, *Maerchen*; Storm, *Immensee;* Hauff, *Das kalte Herz*, *Die Karavane;* Eichendorff, *Aus dem Leben eines Taugenichts.* 3 hours.

B. *Intermediate Course.*—Riehl, *Fluch der Schoenheit;* Jensen, *Die Braune Erica*; Chamisso, *Peter Schlemihl;* Heine, *Harzreise*; Gerstaecker, *Germelshausen;* Lessing, *Minna von Barnhelm;* Schiller, *Wilhelm Tell*, *Lyrics* and *Ballads.* Dictation. Von Jagemann's *Prose Composition and Syntax.* 3 hours.

C. Schiller, *Maria Stuart*, *Die Jungfrau von Orleans;* Goethe, *Egmont;* Sime's *Life of Goethe.* Dictation. First half-year. 2 hours.

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†Authors and books designated under German A, B, C and D indicate the scope rather than the actual works read in these courses.

D. Lessing, *Emilia Galotti*, *Nathan der Weise*, Rollestone's *Life of Lessing;* Goethe, *Iphigenie*. Dictation. Second half-year. 2 hours.

E. *Outline History of German Literature.*—This course is conducted in English, and is open to all College students, whether they are taking German or not. Kuno Francke's *Social Forces in German Literature* will be used as text-book. This reading will be supplemented by twelve lectures. 1 hour.

F. The *Nibelugenlied* and the Classic Period of the Twelfth Century. *Hartman von Aue*, *Wolfram von Eschenbach*, *Gottfried von Strassburg*. Lectures and collateral reading. 2 hours.

G. *Middle High German.*—Otis' *Introduction to Middle High German;* Braune-Paul's *Mittelhochdeutsche Grammatik; Nibelungenlied; Kudrun; Walter von der Vogelweide*. One half-year, 3 hours; a fourth hour at the discretion of the instructor.

H. *Gothic.*—Braune's *Gotische Grammatik;* Heyne's *Ulfilas*. 2 hours.

I. *The Faust Legend and Its Development, and Goethe's Faust.*—Synopsis of the Course:

CHAPTER I. Kindred Legends before the 16th Century. *(a.)* Simon Magus. *(b.)* Ahasuerus. *(c.)* Anthemios, Proterius and Theophilus. *(d.)* Cyprianus Antiochus. *(e.)* Tannhaeuser and Don Juan.

CHAPTER II. The historic Faust; the "Faustbuch" of 1587 and its development; the "Puppenspiele."

CHAPTER III. Faust Dramas before the 18th Century.
(a.) Calderon's El Magico Prodigioso.
(b.) Marlowe's Tragical History of Dr. Faustus.

CHAPTER IV. Faust in the 18th Century.
Lessing's Fragment: Maler Mueller, Klinger, etc.

CHAPTER V. Goethe's Faust.
(a.) the "Urfaust."
(b.) Faust, Part I. 1808.
(c.) Faust, Part II.

This course is conducted entirely in German. The class meets once a week for a 2-hour period.

K. *The Poems of Goethe and Schiller.*—This course is conducted entirely in German. The class meets once a week for 2 hours.

L. *Scientific German.*—German Scientific Reading, *Brandt and Day.* Scientific monographs. 2 hours.

M. *A Course in Colloquial German and German Conversation* 1 hour.

FRENCH LANGUAGE AND LITERATURE.

PROFESSOR SMITH AND PROFESSOR HILLS.

A. *Elementary Course.*—Fraser and Squair's *French Grammar;* Rollin's *Reader;* Malot, *Sans Famille;* Dumas, *La Tulipe Noire;* Erckmann-Chatrian, *Madame Thérèse.* Prose composition based on Daudet's *La Dernière Classe.* Sight reading. 3 hours.

B. *Intermediate Course.*—Modern fiction and plays. Much ground is covered, and especial attention paid to pronunciation. Some of the books read are: Sand, *La Mare au Diable;* About, *Le Roi des Montagnes;* Hugo, *Bug Jargal;* Merimée, *Colomba;* Gréville, *Dosia;* Molière, *Le Médecin Malgré Lui;* Corneille, *Le Cid;* Racine, *Athalie.* Composition based on *Le Siège de Berlin* and *Colomba.* 3 hours.

C. *Classic Period.*—Representative plays of the great classical dramatists are read. Much reading is done; very little translation. Students do outside reading and hand in written reports. A series of lectures on the history of the French theatre is given. This course is conducted partly in French. First half-year, 2 hours.

D. *Nineteenth Century Drama.*—A series of lectures on the development of Romanticism in French Literature. Some of the plays read are: Hugo, *Hernani, Ruy Blas;* two comedies of de Musset; de Bornier, *La Fille de Roland;* Rostand, *Cyrano de Bergerac.* Second half-year, 2 hours.

I. *Conversation.*—The course is designed to give as much training as possible in understanding and speaking the language. Some short stories will be read and reported in French, but most of the time will be given to the use of the expressions heard in every-day life. The course may be taken as a supplementary hour to C and D, but is open to other students of similar preparation. 1 hour.

E. *Comedies of Molière.*—The more important comedies of Molière will be read bv the instructor. Lectures on Molière and his time. Students desiring this course must consult the instructor. Two consecutive hours each week. PROFESSOR AHLERS.

F. *Critical Study of Classic Authors.*—Last year Bossuet and Pascal were studied. Duval's *Histoire de la Littérature Francaise* is used as a basis for a review of literature. Outside reading, and written reports in French. Course conducted in French. First half-year, 2 hours.

G. *French Lyric Poetry.*—Study of its development, versification, and forms. Course conducted in French. Second half-year. 2 hours.

H. *Old French.*—Clédat's *Chrestomathie du Moyen-Age* and part of *Aliscans* and *Raoul de Cambrai* will be read. The elementary principles of French phonetics will be given. For conditions of admission, see instructor. 2 hours.

SPANISH LANGUAGE AND LITERATURE.

PROFESSOR HILLS.

A. *Elementary Course.*—Hills and Ford's *Spanish Grammar;* Ramsay's *Spanish Reader;* Alarcon's *El Capitán Veneno;* Echegaray, O locura ó santidad; Galdos' *Doña Perfecta.* Elementary prose composition, writing from dictation, and practice in conversation. 3 hours. Students are advised not to elect Spanish A and Italian A in the same year.

B. *Modern Literature of Spain and Spanish-America.*—First half-year: Selections from the prose writers of the Nineteenth Century. Second half-year: Ford's *Spanish Anthology;* Hills' *Bardos Cubanos.* Lectures and collateral reading. 2 hours. Not given in 1904-1905. To be given in alternate years.

C. *Spanish Literature of the Sixteenth and Seventeenth Centuries,* with an especial study of Cervantes, Lope de Vega, and Calderon. Lectures and collateral reading. Prerequisite, Course A, or equivalent. 2 hours.

NOTE.—In Courses B and C there are bi-weekly exercises in prose composition.

ITALIAN LANGUAGE AND LITERATURE.

PROFESSOR HILLS AND PROFESSOR SMITH.

A. *Elementary Course.*—Grandgent's *Italian Grammar*; Bowen's *Italian Reader;* Goldoni, *Il vero amico;* Manzoni, *I promessi sposi.* 2 hours.

B. *Italian Literature of the Thirteenth and Fourteenth Centuries*, with an especial study of Petrarca and Dante. Lectures and collateral reading. 2 hours. (Not given in 1904-1905. To be given in alternate years.)

ECONOMICS.

PROFESSOR URDAHL.

A systematic course in the elements of Political Economy, required of all students, is followed by elective courses in special subjects. Course A is a prerequisite to any of the electives except F, and I.

A. *Elements of Political Economy.*—Required of Juniors. Text: Ely's *Outlines of Economics*. First half-year, 2 hours.

B. *Charities and Corrections.*—The theory and history of charity and reformatory work. Students are encouraged to study the charitable and correctional institutions in the vicinity of their own homes. Text: Warner's *American Charities*. If possible, additional lectures by men who have devoted special attention to some phase of these subjects. Second half-year, 3 hours.

C. *Money and Banking.*—An historical and theoretical course in money and banking, treating especially the production of the precious metals, the theory of value, the history of prices, bimetallism, paper money, bank notes, etc. Lectures, recitations, reports and discussions. Text: Scott's *Money and Banking*. Alternate with Course D. First half-year, 3 hours. (Not given in 1904-1905.)

D. *Socialism.*—An historical and critical course in socialism and socialistic theory. Especial attention is paid to the historical basis of socialism, the French Revolution, the idealists, the German scientific socialists, the Christian socialists, the State socialism of to-day, and also to the various attempts at socialistic reforms. Lectures and recitations. First half-year, 3 hours.

E. *Colonial Policy.*—The theories of colonization and the economic ideas and institutions underlying the modern expansionist movement; a brief history of the colonial experiments of the great colonizing nations of the world: Spain, Portugal, Holland, France, England and Germany. Lectures supplemented by outside reading. Second half-year, 2 hours. (Not given in 1904-1905.)

F. *Economic and Social History of the United States.*—Alternate with History B. 2 hours. (Not given in 1904-1905.)

G. *Public Finance.*—Taxation, public expenditure, public debts and the budget. Lectures with collateral reading. Text: Adam's *Finance.* Second half-year, 3 hours.

H. *History of Economic Theory.*—Special emphasis is laid on the theories of rent, wages and profits. Lectures, collateral reading and reports. Second half-year, 2 hours.

I. *Economic Geography.* Elementary course. First half-year, 2 hours.

POLITICAL SCIENCE.

Professor Urdahl.

A. *Historical Politics.*—The origin and growth of government from its primitive forms to the establishment of the modern states, the semi-amorphous horde, gentile society, the ancient city, the Athenian Democracy, the Greek Confederations the Roman Republic and Empire, the Germanic folk, the feudal system, the political system of the Church, the Holy Roman Empire, the rise of national states, the development of absolute and constitutional monarchy, the growth of democracy, etc. Lectures supplemented by recitations and reports. Text: Wilson's *State.* First half-year, 3 hours. (Not given in 1904-1905.)

B. *Comparative Politics.*—A study and comparison of the governments of the chief modern States; an exposition of the constitutional law of the United States and England and of their actual political organization. The great problems of federalism and centralization, presidential and responsible ministerial government, colonial government and civil liberty, receive especial consideration. Lectures, recitations and collateral reading. Text: Bryce's *American Commonwealth.* Second half-year, 3 hours. (Not given in 1904-1905.)

C. *Elementary Law.*—The leading principles of law and their practical application. Alternate with Course A. First half-year, 3 hours.

D. *American Constitutional Law.*—The theory and practical working of the Federal Constitution; recent changes and present tendencies. Reading, lectures and leading cases. Alternate with Course B. Second half-year, 3 hours.

E. *International Law.*—Second half-year, 2 hours. (Not given in 1904-1905.)

F. *Contracts.*—Texts: Clark on Contracts, Langdell and Williston's Cases on Contracts. 3 hours. MR. HENRY MCALLISTER, JR.

HISTORY.*

PROFESSOR URDAHL.

A. *English History.*—The Political history of England from the earliest times to the American Revolution. Recitations and collateral reading, supplemented by lectures on the constitutional and economic development. Required of Sophomores. 2 hours.

B. *American History.*—A general survey, with emphasis on political and economic history. Course A is recommended as a preparation. In special cases the course may be elected for one half-year.

(*a.*) First half-year: To the close of the Revolution. 2 hours.

(*b.*) Second half-year: From the Revolution to the present time. 3 hours.

C. *The Napoleonic Era and Modern Times.*—The history of Western Europe in the nineteenth century. Second half-year, 2 hours.

D. *Modern History to the French Revolution.*—Alternate with Course C. Second half-year, 2 hours.

E. *Mediaeval History.*—A survey of the general history of Continental Europe through the period which lies between Ancient and Modern history. First half-year, 2 hours.

F. *Roman History.*—From the earliest times to the fall of the Roman Empire. Second half-year, 2 hours. ASSISTANT PROFESSOR BREHAUT.

MATHEMATICS.

PROFESSOR CAJORI AND PROFESSOR LOUD.

A. (*1.*) *Algebra.*—Series; The Binomial Theorem; Logarithms. Undetermined Coefficients; Theory of Equations. 4 hours till January.

*See also Political Science A (*Historical Politics*) and Economics F (*American Economic History.*)

A. (2.) *Solid and Spherical Geometry.*—Planes and lines in Space; Polyhedra, the Cylinder, Cone and Sphere; Spherical Triangles. Second half-year, 2 hours.

A. (3.) *Plane Trigonometry.*—The functions of one and two angles; The solution of triangles; simple applications. 4 hours during January. Second half-year, 2 hours.

A. (4.) *Spherical Trigonometry.*—Second half-year, 2 hours.

B. (1.) *Analytical Geometry (Elementary).*—Plane Loci of first and second order. First half-year, 3 hours.

B. (2) *Analytical Geometry (More Advanced).*—More thorough study of plane loci, some attention being given to modern methods. Second half-year, 2 hours.

C. *Calculus, Differential and Integral.*—First half-year, 3 hours: Second half-year, 4 hours.

D. *History and Logic of Mathematics.*—This course is planned especially for those who are fitting themselves to be teachers of Mathematics. One half-year, 2 hours.

E. **Modern Methods in Geometry.*—One half-year, 3 hours.

F. **Theory of Equations.*—One half-year, 3 hours.

H. **Determinants.*—One half-year, 2 hours.

J. *Theoretical Mechanics.*—4 hours.

I. *Elementary Surveying.*—Field work and computation. Fee, $4. Second half-year, 3 hours.

*Of Courses E. F. and H only two are given in any one year.

ASTRONOMY.

Professor Loud.

A. *Elementary Astronomy*—The descriptive, rather than the mathematical side of Astronomy, is emphasized. Text: Young's *Manual of Astronomy*. Essays are required. Second half-year, 3 hours.

B. *Observations and Computations.*—Prerequisite, Mathematics A (3). Astronomy A is recommended in preparation. The student is expected to make free use of the telescope and transit instrument, and to use his observations in the solution of simple problems. First half-year, 3 hours (including the observatory work counted as laboratory periods.)

C. *Celestial Mechanics.*—The work of Moulton is used as a text-book. Prerequisite, Differential and Integral Calculus. 2 hours. First half-year or throughout the year.

D. *Elementary Meteorology.*—Prerequisite, Elementary Physics. Text: Davis' *Elementary Meteorology.* Second half-year, 3 hours.

E. *Field Astronomy for Engineers.*—Comstock's work of this title is used as a text. Second half-year, 3 hours.

PHYSICS.

PROFESSOR SHEDD.

ELEMENTARY COURSES.—Prerequisite, one year's Preparatory Physics and Plane Trigonometry.

A. *General Physics.*—Lectures, recitations and laboratory work. 3 hours.
First half-year: Mechanics of solids, liquids and gases; Heat, Sound.
Second half-year: Magnetism, Electricity, Light.

B. Same as Physics A with additional laboratory work. 4 hours.

H. *General Physics.*—For students of Engineering. Lectures, recitations and laboratory work. Text, Watson's *A Text-book of Physics.* 4 hours.

ELECTIVE COURSES.—

G. *Problem Work.*—Second half-year, 2 hours. Open to students in Courses A and B.

C. (1) **Theoretical Physics.*—2 hours.
First half-year: Theory of Heat.
Second half-year: Theory of Light.

C. (2) **Theoretical Physics.*—2 hours.
First half-year: Theory of Electricity and Magnetism.
Second half-year: Applications to Electromagnetic Machinery, or Elements of Alternating Currents

D. †*Practical Physics.*—Laboratory work: Determination of Physical Constants in Mechanics, Heat, Electricity and Magnetism. Problems in Light and Sound. 2 hours.

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*Courses C (a) and C (b) will not be given the same year.
†Course D may be taken only with Course C (a) or C (b).

E. *Lectures on Advanced Physics.*—Prerequisite, The Calculus. 1 hour.

First half-year: Physical Constants and Instruments of Precision.

Second half-year: Magnetism and the Magnetic Circuit.

F. Seminary of Current Literature. 1 hour.

In Courses A, B, D and H a fee of $2.00 per half-year for each hour's credit will be charged.

CHEMISTRY.

PROFESSOR STRIEBY AND MR. COOLBAUGH.

A. *Elementary Chemistry.*—Text-book work (chiefly Inorganic Chemistry) supplemented by lectures and discussions upon the fundamental laws, the application of chemistry to sanitary science, medicine and some of the arts, and also by occasional papers from descriptions in technical books, and by reports of visits to metallurgical and manufacturing establishments. Remsen's *College Chemistry.* 3 hours' recitation and 4 hours' laboratory work (counts 3 hours).

B. *Advanced Chemistry.*—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulation of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. 3 hours' recitation or lectures and 4 hours of laboratory work (counts 3 hours.)

C. *Qualitative Analysis.*—Prerequisite, Chemistry A or equivalent. Experimental drill in obtaining characteristic reactions of the more common elements, study of empirical formulæ and symbolic expression of reactions, solution of substances,

separation of groups of elements, and finally analysis—first of simple salts and later of complex mixtures. The analytical work is confined almost wholly to inorganic substances, but includes certain common organic acids and a few organic bodies of general and medicinal use. 9 hours (counts 4.)

D. *Quantitative Analysis.*—Prerequisite, Chemistry C. The laboratory work comprises determinations of single elements by approved methods, gravimetric and volumetric, followed by the analysis of selected salts, ores, slags, mineral water and commercial products. A few rapid or commercial determinations are given as the final work. The lectures treat of the methods of analysis, properties of precipitates, stoichiometry, sampling, reporting and the theory of solutions. The laboratory work occupies 3 consecutive hours 4 days a week (counts 4 hours.) Cairn's *Quantitative Analysis.*

E. *Organic Chemistry.*—Prerequisite, Chemistry A or B. Reunsen's *Organic Chemistry.* Lectures and discussions of special subjects and processes. 3 hours' recitation and 3 hours' laboratory work (counts 3 hours.)

F. *Theoretical Chemistry.*—Prerequisite, Chemistry B. Text-book work with lectures and oral and written discussions. 3 hours.

G. *Medical Chemistry.*—Prerequisite, Chemistry B. Lectures, text book, assigned reading and laboratory work. Study is given mainly to substances, inorganic and organic, that are of importance in medical science and hygiene. Especial attention is devoted to the analysis of urine, water, milk, metallic poisons, and the use of disinfectants. The needful gravimetric determinations, considerable volumetric work with burettes and standard solutions, and microscopic and spectroscopic tests, supplement the usual qualitative examinations. 3 hours' recitation, 4 hours' laboratory work (counts 3 hours.)

The fee for every course must be paid in advance. It covers the cost of gas, chemicals and non-returnable supplies, except platinum. Glassware and necessary apparatus (except platinum vessels) are loaned to the student and must be returned in good condition. The fees are as follows.

Academy Course	$ 6.00
Course A	7.00
Course B	8.00
Courses C, D, E and G, each	15.00

BIOLOGY.

Professor Schneider.

A. *General Biology.*—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiation, heredity, evolution. First half-year: Laboratory study of typical green flowering plants, with special reference to the structure and function of their various organs; a comparative study of cryptogams, beginning with the simplest forms. Second half-year: Careful dissection of the frog and microscopic study of some of the more important organs; some of the simpler forms of animals. Recitations or lectures, 2 hours and laboratory work, 4 hours (counts 3 hours.)

B. *Zoology.*—Prerequisite, Biology A. Lectures and recitations on the History of Zoology, Systematic Zoology, Morphology, and Embryology. Dissection of various classes and orders of animals up to chordata, with careful microscopic study of the finer structures. 6 hours (counts 3 hours.)

C. *Physiology.*—Prerequisites, Biology A and Chemistry B. Lectures, recitations, demonstrations and practical work by the student, including the physiology of the following:—circulation, respiration, digestion, muscle, and nerve. 6 hours (counts 3 hours.)

D.* *Comparative Anatomy of Vertebrates.*—Prerequisite, Biology B. Careful dissection of the Amphioxus, Cyclostome, Fish, Amphibian, Reptile and Bird. Lectures, collateral reading, and recitation. First half-year, 6 hours (counts 3 hours.)

E.* *Mammalian Anatomy*—Prerequisite, Biology B. The work is based upon a detailed dissection of the cat. Other material is used to illustrate the anatomy of special organs. Lectures and collateral reading. Second half-year, 6 hours (counts 3 hours.)

F.† *Histology.*—Prerequisite, Biology A. A comparative detailed study of the tissues of the higher animals. Preparations of the principal tissues and organs are made and the common methods of preparation and mounting studied. Special microscopic drill is given in distinguishing the different tissues and organs. First half-year, 6 hours (counts 3 hours.)

G.† *Embryology and Cytology.*—Prerequisite, Biology F. A study of maturation, fertilization and cleavage of the ovum, early stages of the embryology of the chick and frog. Special attention is given to the differentiation and development of tissues and

organs. Students make most of their own preparations. 6 hours (counts 3 hours.)

H.* *Bacteriology.*--Prerequisite, Biology A. Apparatus; culture media and methods of preparation; sterilization methods; microscopic characteristics of cultures of bacteria in general and of special forms, and methods of diagnosis; methods of obtaining pure cultures; methods of staining; bacteriological investigations of water, air, and soil. 5 hours (counts 2 hours.)

I.* *Sanitary Science and Public Health.*—A lecture course. Some of the topics discussed are: Death and its causes; classification of diseases; ancient and modern theories of disases; germ theory of infectious disease; direct causes and predisposing causes of disease; means of avoiding and resisting disease; vehicles of disease such as dust, sewage, water, etc.; brief sketch of the important transmissible and epidemic diseases, prophylaxis, etc. It is expected that students electing Bacteriology will take this course. 1 hour.

J.† *Plant Histology.*—Prerequisite, Biology A. Methods of killing, fixing, imbedding, staining, etc. The student prepares slides of representative forms of all plant groups from Thallophytes through Angiosperms. First half-year, 6 hours (counts 3 hours.)

K.† *Plant Physiology.*—Prerequisites, Biology J, Chemistry B. and Physics A. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. Second half-year, 6 hours (counts 3 hours.)

L. *Systematic Cryptogamic Botany.*—Comparative study of structure, development and classification of various classes and orders: culture methods for fungi. Second half-year, 3 hours. DR. STURGIS.

Laboratory fees: Courses A, E, and L each. $2.00; Courses F, G, J, K, each. $2.50; Courses B, D, each, $3.00; Courses C, H, each, $4.00.

*Starred courses are offered in 1904-05 and alternate years.

†Courses F, G, J, K will be offered in 1905-06 and alternate years.

GEOLOGY.

PROFESSOR FINLAY.

A. *General Geology.*—Prerequisite, Elementary Chemistry. Dynamical, Structural and Historical Geology. Lectures, required reading and field excursions on Wednesday afternoons until Thanksgiving. The student, while not required to do so,

is advised to elect Mineralogy and Zoology before taking Geology or at the same time with it. Texts: Geikie's *Text-book of Geology*, Scott's *Introduction to Geology*. 3 hours.

B. *Mineralogy.*—Prerequisite, Elementary Chemistry. Required for Courses E and H. The economic or ore classification of minerals is used and the time is devoted chiefly to laboratory work in Descriptive and Determinative Mineralogy. Texts: Moses and Parsons' *Mineralogy, Crystallography and Blow-pipe Analysis*, Williams' *Elements of Crystallography*. Laboratory fee, three dollars. Uniform individual working outfits are furnished at cost. 6 hours (counts 3 hours.)

E. *Economic Geology.*—Prerequisites, Geology and Mineralogy. Lectures and required reading. The geology and mineralogy of the ore deposits of the United States, gold, silver, copper, lead, zinc, iron. The greater part of the second half-year is devoted to the consideration of coal, building stones, and the less important non-metallic minerals. In the spring there are voluntary field excursions to mining localities. Texts: Kemp's *Ore Deposits of the United States and Canada*, Kemp's *Economic Geology of the Non-metallic Minerals*. 3 hours.

F. *Invertebrate Paleontology.*—Lectures and laboratory work. Systematic study of the chief classes of the invertebrates by means of fossils, with special attention to the structure and development of the trilobites and brachiopods. Collections are made in the field to afford training in the identification of geological horizons. First half-year, 3 hours. Offered in alternate years, 1904-05 and 1906-07.

G. *Vertebrate Paleontology.*—Lectures, laboratory work on the museum collections and required reading on the main lines of mammalian descent from the Eocene to recent times. Second half-year, 3 hours. Offered in alternate years, 1903-04 and 1905-06.

H. *Petrography.*—Prerequisites, Courses A and B. Lectures, and laboratory work with the microscope on the commoner rock-forming minerals and the principal rock types. First half-year, 3 hours.

I. *Field Geology.*—The systematic investigation in the field of 150 square miles immediately adjacent to Colorado Springs with the preparation of maps and a report. Individual work under the guidance of the instructor.

BIBLE STUDY.

PROFESSOR PARSONS.

The following courses are offered in successive years:

I. Introduction to the Books of the New Testament.
II. The Life of Christ (2 years).
III. Old Testament Literature.
IV. The Life of Paul.

In 1904-1905 the class will study the second year of Course II.

The class meets one hour a week.

MUSIC.

For such students as desire courses in Music, the following are provided: Piano, organ, violin, voice, harmony, counterpoint and composition. Of these, only harmony, counterpoint and composition are counted towards a degree. Courses in Music are not included in the regular tuition fee. The charges for each half-year for two lessons a week are as follows:

CLASS LESSONS, ONE HOUR LONG.

Piano-forte, violin, voice, each	$25 00
Harmony	12 00
Counterpoint	18 00
Composition	22 50

PRIVATE HALF-HOUR LESSONS.

Piano-forte, violin, voice, organ, each	$35 00

Rent of Piano, one hour each day, for one half-year	3 00
Rent of Piano, two hour each day, for one half-year	5 00
Rent of Piano, each additional hour, for one half-year	2 00
Rent of two-manual organ 1 hour each day, for one half-year	5 00
Rent of three-manual organ, 1 hour each day, for one half-year	10 00

Students of Music register with the Dean of the College. They will be accepted only on payment of a full term's tuition. No deduction will be made for absence from lessons, except on account of prolonged illness.

PHYSICAL TRAINING.

The open climate of Colorado Springs makes outdoor sports possible and attractive throughout the year. Tennis is played throughout the winter, track and baseball practice is begun as soon as the football season is over. A gymnasium, heated by steam and furnished with shower baths, lockers, etc., serves for indoor exercises.

Football, baseball, basketball and track athletics are managed

by the Colorado College Athletic Association. The interests of the Association are controlled by a Board, consisting of Professors Smith, Cajori, Noyes, Messrs. W. R. Armstrong, J. P. Shearer, C. H. Mallon and nine representatives from the College, including the Captains of the teams. Mr. Willis R. Armstrong is President of the Board.

In 1898 the Athletic Association built, at large expense the Washburn Athletic Field. For this purpose, the natural amphitheatre in the rear of the College buildings, facing the mountains, was used. About five acres of ground were leveled and enclosed by an eight-foot fence, and a fine grand stand, with a seating capacity of 600, was erected. In 1900 a grand stand, seating 800, was given by Mr. J. F. Burns. For adaptation to its purposes, there is no more complete and satisfactory college athletic field in the West: for situation and beauty of its surroundings, it is certainly unrivalled.

THE MASTER'S DEGREE.

The Master's degree is conferred subject to the following conditions:

(1) The applicant must have received the Bachelor's degree from some reputable College or University.

(2) If the applicant becomes a resident student of Colorado College, he must pursue a minimum course of six hours per week for one year, two-thirds of the work being in one department. In addition, he must present a satisfactory thesis on a subject approved by the Faculty, such thesis to represent one-half of the requirement for the degree.

(3) In case of non-residence, the applicant must complete a minimum requirement equivalent to ten hours of lectures per week for one year, of which the equivalent of seven hours must be in one department, and at least two academic years must elapse before the degree is conferred. A thesis is required, as in the case of the resident student.

The fees are $20 a year for tuition, $5 for the diploma, and $1 to bind the thesis. The thesis must be typewritten on paper of a prescribed size, and a copy deposited with the College librarian.

Applications for the Master's degree should be sent to the Chairman of the Faculty Committee on post-graduate degrees (see p.15), who will furnish information about courses.

HONORS AND SCHOLARSHIPS.

Scholarship Honors of two grades are awarded at Commencement for excellence in the work of the year. The Honor list for 1902-'03 was as follows:

HIGH HONORS.

James Arthur Birchby, '04.
Jean Rose Ingersoll, '05.
Mabel Jencks, '04.
Laura Stiles, '05.
Agnes Wiley, '05.

HONORS.

Lester Snow Bale, '05.
Louise Estelle Dunbar, '04.
Ella Sabin Fillius, '03.
Marjorie True Gregg, '05.
Maurice C. Hall, '05.
Ethel Harrington, '04
Violet Louise Holcombe, '06.
Alice I. Kidder, '06.
Alice B. McGee, '04.
Joseph Harold Nash, '04.
Ella Louise Warner, '04.
Sarah Foss Wolverton, '04.

PERKINS SCHOLARS.

Lester Snow Bale, '05.
Laura Stiles, '05.

HAWLEY SCHOLARS.

Lola Davis, '05.
Louise Estelle Dunbar, '04.
Jessie Gordon, '04.
Sarah McDowell, '05.
Eulalie Reinhardt, '04.
Maude Stoddard, '05.

C. C. HEMMING SCHOLAR.

Albert Chain Hardy, '04.

MARY G. SLOCUM SCHOLAR.

Frank Andrews Pettibone, '04.

THE PRESIDENT'S SCHOLAR.

Jean Rose Ingersoll, '05.

HASTINGS PRIZES.

1. O. D. Sherer, '03.
2. H. L. McClintock, '03.

COLONIAL DAMES' PRIZE.

Mary C. Porter, '05.

SCHOOL OF ENGINEERING.

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.,
President.

FLORIAN CAJORI, PH. D.,
Dean and Head Professor of Mathematics.

LOUIS A. E. AHLERS, A. B.,
Head Professor of Modern Languages and Literatures.

JOHN AUGUSTUS BETJEMAN, B. S., M. E.,
Instructor in Surveying.

CHARLES G. COLLAIS,
Superintendent of Mechanical Laboratories.

MELVILLE FULLER COOLBAUGH, B. S.,
Instructor in Chemistry.

GEORGE IRVING FINLAY, PH. D.,
Professor of Geology, Mineralogy and Paleontology.

ELIJAH CLARENCE HILLS, A. B.,
Professor of the Romance Languages and Literatures.

FRANK HERBERT LOUD, PH. D.,
Professor of Mathematics and Astronomy.

HOWARD MOORE, C. E.,
Instructor in Drafting and Machine Design.

SIDNEY F. PATTISON, A. B.,
Assistant Professor of English.

JOHN CUTLER SHEDD, PH. D.,
Professor of Physics.

HUGH ALLISON SMITH, A. M.,
Professor of French.

WILLIAM STRIEBY, A. M., E. M.,
Professor of Chemistry and Metallurgy.

NOTE.—As need arises, other instructors will be added to the Faculty.

ORGANIZATION OF THE SCHOOL.

The present rapid development of Colorado and the West has created so imperative a demand for instruction in pure and applied science that the Trustees of Colorado College, at the meeting held on Dec. 26, 1902, decided to add to the existing departments of the institution a School of Engineering. Colorado Springs is admirably situated for such a school. The suburban electric railway takes the student to three different plants for the reduction of ore; the mines of Cripple Creek and the metallurgical works of Pueblo are near by; there are in the neighborhood fine examples of mountain railway construction and large electric plants with machinery of modern type. By careful study of local engineering problems and by close contact with the engineering establishments of this vicinity, it will be possible to secure a thorough blending of theoretical and practical instruction.

This year the studies and the shop-work of the Freshman and the Sophomore years are given; in 1904-05 the Junior studies will be added; and the year following the entire schedule will be offered. To carry out the Junior and Senior work new instructors will be appointed to the Faculty and the necessary equipment of the engineering laboratories will be added. Palmer Hall, which has recently been finished, furnishes ample accommodations for the work in engineering, and for the Mechanical Laboratories two separate buildings have been erected. For a description of laboratories, see pp. 59 and 74. The Assay, Testing and Electrical Laboratories will be equipped for 1904-05.

REQUIREMENTS FOR ADMISSION.

The requirements for admission to the engineering courses are as follows:

1. MATHEMATICS—(*a.*) Algebra through simultaneous quadratic equations; (*b.*) Elementary Plane Geometry; (*c.*) Solid and Spherical Geometry; (*d.*) Plane Trigonometry. For a full description of the requirements in Mathematics, see p. 17. A thorough preparation is of great importance. Students are advised to review Algebra during the last year of the high school course. The schedule of recitations in the Freshman year will be so arranged that students who, on entering, are behind in Plane Trigonometry, but are able to carry a heavy course, may take this subject during the second half-year in addition to their regular work.

2. PHYSICS—One year's course. See p. 20.

3. CHEMISTRY—One year's course. See p. 20.

4. BIOLOGY—One year's course. In place of Biology may be substituted an equivalent amount of Botany, Physiology, Physiography, or Geology, any two of these to be counted the equivalent of Biology.

5. ENGLISH—As in the College entrance examinations. See p. 17.

6. FOREIGN LANGUAGES—Two years. See pp. 18, 19.

7. AMERICAN OR ENGLISH HISTORY—One year's course. See p. 17.

DEGREES.

At the completion of an engineering course the student will receive the degree of Bachelor of Science, with a specific designation of the engineering course taken.

MINING ENGINEERING.

The object of this course is not only to lead to the mastery of the theory, but also, as far as possible, to bring the student into contact with the practical work of the mining engineer. The outline of the mining course is as follows:

Freshman Year.

First Half-year.	Hours per week.	*Second Half-year.*	Hours per week.
Mathematics A (1) (p. 40.)	4	Descriptive Geometry, (p. 58.)	3
Chemistry B, (p. 43)	7	Trigonometric Computation	1
Free Hand and Mechanical Drawing, (p. 57.)	6	Chemistry B	7
Shop-work, (p. 59.)		Mechanical Drawing	6
English B, (p. 32.)	3	Elementary Surveying, (p. 58.)	6
Modern Languages, (pp. 34-37)	3	English B	3
		Modern Languages	3

Sophomore Year.

Mathematics B (1) (p. 41.)	3	Mathematics B (2)	2
Mathematics C, (p. 41.)	3	Mathematics C	4
Chemistry C, (p. 43.)	7	Chemistry C	7
Physics C, (p 42.)	4	Physics C	4
Geology B, (p. 46.)	3	Geology B	3
Machine Design, (p. 57.)	2	Modern Languages	2
Modern Languages, (p. 34-37.)	2	Forging, (p. 59.)	3

Junior Year.

Mechanics	4	Mechanics	4
Geology	3	Geology	3
Assaying	12	Assaying	12
Mining Surveying	4	Materials of Construction	4
Materials of Construction	3	Structural Metals and Fuels	2
Strength of Materials	3	Graphic Statics	4

Senior Year.

Economic Geology	3	Petrography	3
Hydraulics	2	Metallurgical Laboratory	3
Ore Crushing, Sampling and Fluxing	3	Field-work	4
Gold and Silver Mining	3	Lectures on Mining	3
Lead and Copper Mining	3	Inspection Tours	
Elementary Law	3	Thesis	

CIVIL ENGINEERING AND IRRIGATION.

This course aims to give the student a thorough training in the fundamental principles of general engineering, and a

measure of specialization in civil and irrigation engineering along the lines demanded by conditions in Colorado and the West.

Freshman Year.

As in the Mining Engineering Course.

Sophomore Year.

First Half-year	Hours per week
Mathametics B (1) (p. 41)	3
Mathematics C,(p. 41.)	3
Advanced Surveying (p. 58.)	5
Physics C. (p. 42.)	4
Geology B, (p. 46.) / Agricultural Chemistry	3
Machine Design, (p. 57.)	2
Modern Languages, (pp.34-37)	2

Second Half-year	Hours per week
Mathematics B (2)	2
Mathematics C	4
Astronomy (p.41.)	3
Physics C	4
Graphic Statics, (p. 57.)	4
Modern Languages	2
Forging (p. 59.)	3

Junior Year.

Mechanics	4
Strength of Materials	3
Hydraulics	2
Steam Engineering	2
Materials of Construction	2
Generation and Transmission of Power or / Hydrographic Survey	2
Geology	3

Mechanics	4
Railway Construction or / Meteorology	3
Geodesy	2
Masonry Arches and Dams	3
Roof Trusses and Girders	4
Materials of Construction (laboratory)	4
Trigonomeric Survey	1

Senior Year.

Dams and Stereotomy	2
Bridge Stresses	5
Railway Engineering	2
Water Supply	3
Elementary Law	3

Tunnels and Substructures	2
Irrigation	2
Sanitary Engineering	3
Municipal Engineering (roads and parks)	2
Mining	3
Inspection Tours.	
Thesis.	

ELECTRICAL ENGINEERING.

This course embraces an extensive study of electro-magnetism and also a considerable amount of the work usually done in mechanical engineering. The last two years include courses in steam engineering, testing of dynamos, study of alternating current machinery, electric railways, electric lighting, etc.

Freshman Year.

As in the Mining Engineering Course, except that shop-work takes the place of surveying during the second half-year.

Sophomore Year.

As in the Mining Engineering Course, except that shop-work will take the place of Mineralogy.

Junior Year.

First Half-year.	Hours per week.
Mechanics	4
Strength of Materials	3
Hydraulics	2
Steam Engineering	2
Materials of Construction	3
Generation and Transmission of Power	2
Machine Work and Tool Making	2
Electro-magnetism	3

Second Half-year.	Hours per week.
Mechanics	4
Steam Engineering	2
Applied Electro-magnetism	5
Electrical Testing	2
Materials of Construction	4
Machine Design	2

Senior Year.

Alternating Currents	5
Testing Direct Current Dynamos	2
Engine and Boiler Trials	2
Gas Engines	1
Machine Design	2
Central Station Design	2
Elementary Law	3
Alternating Currents and Theory of Transformers	5
Electric Railways	3
Electric Lighting	5
Electricity in Mining and Quarrying	1
Inspection Tours.	
Thesis.	

GENERAL COURSE IN ENGINEERING.

This course permits greater freedom in the election of studies than do the preceding engineering courses. It is intended as a non-professional technical course, which offers opportunities for the student to combine the liberal culture studies and elementary law with studies in applied science. The course aims to give a technical education less extensively specialized. It will supply a practical education for persons eventually looking forward to positions as superintendents, managers, secretaries, or directors of engineering enterprises.

Freshman Year.

As in the Mining Engineering Course.

Sophomore Year.

First Half-year.	Hours per week.	*Second Half-year.*	Hours per week.
Mathematics B (1)	3	Mathematics B (2)	2
Mathematics C,	3	Mathematics C,	4
Physics C, (p. 42.)	4	Physics C	4
Modern Languages, (pp.34-37)	2	Graphic Statics, (p. 57.)	4
General Electives, (pp 24-26)	6	Modern Languages	2
		General Electives	4

Junior Year.

Mechanics	4	Mechanics	4
Materials of Construction	3	Materials of Construction, (laboratory work)	4
Generation and Transmission of Power	2	Geodesy	2
Geology	3	General Electives	8
General Electives	7		

Senior Year.

Economic Geology	3	Electives.	
Elementary Law	3	Inspection Tours.	
Electives	12	Thesis.	

DRAWING, MACHINE DESIGN AND GRAPHIC STATICS.

The course in Mechanical Drawing in the Freshman year includes elementary exercises to develop facility in the

use of the instruments, selected geometrical problems, cross sections, shading with the right line and the bow pen, mathematical curves, isometric drawings, orthographic projections, the form and proportions of standard letters, both free-hand and ruled, methods of spacing and laying out titles. Students are expected to devote more time to drawing than the number of hours assigned in the schedule, but may do the extra work at such hours as suit their convenience.

Descriptive Geometry is required of all engineering students in the Freshman year. The work consists of recitations from text-books and the graphic solution of problems. A number of thread-models of ruled surfaces are available for class-room instruction.

The course in Machine Design in the Sophomore year includes the copying and tracing of machine drawings, drawing to scale from models and machine parts, and laying out tooth-wheel gearings.

The course in Graphic Statics, which includes the study of forces, stresses, couples and moments of inertia, is introductory to the later courses on Trusses and Girders.

Students in all engineering courses are expected to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

SURVEYING.

The course in Surveying in the Freshman year includes an elementary study of surveying methods and instruments. It is conducted by means of recitations, lectures and field work. Field practice is preceded by the individual study of each instrument and followed by instruction in platting from field notes. Fee, $4.

The advanced course in Surveying in the Sophomore year includes triangulation, topographic, hydrographic, city and general railroad surveying, with practice in the use of plane table, stadia, and solar transit, mapping and plotting contours and profiles, with calculations appertaining thereto. Fee, $4.

MECHANICAL LABORATORIES.

In addition to the theoretical study of professional subjects, it is desirable that engineering students should acquire some practical knowledge in carpentry, wood-turning, machinists' bench and vise-work, iron lathe work and blacksmithing. To carry on this work there have been fitted out three laboratories.

The Wood-working Laboratory is equipped with benches, individual tool cases and tools, six lathes for wood-turning and pattern-making, two circular saws, band-saw, planer, and tool-sharpening machinery.

The Iron-working Laboratory is equipped with Bradford lathes and machine-tools, drill press, iron hack-saw, grinding machinery, etc. There are facilities for bench-work, filing, chipping, etc. Before the end of a course students jointly construct one or more complete machines.

The Forging Laboratory contains blast forges, each with its anvil and hand tools, vises, benches, etc.

Fees per half-year: $3 for forging, $4 for work in wood or iron.

DEPARTMENT OF ART AND DESIGN.

ARTUS VAN BRIGGLE.....*Critic*
WILLIAM DITTKE .....*Instructor*

Instruction is given in Academic drawing, painting, modeling, artistic anatomy, historic ornament, decorative designing, illustration, mechanical drawing and perspective. Emphasis is placed upon thoroughness and maintenance of artistic ideals, and students are encouraged to strike out along original lines. Those without previous training devote most of their time to drawing in pencil and charcoal from the cast and still life, but from the first some work is done with colors. Advanced students draw and paint from life in charcoal, oil, water color and pastel. Every week a subject to be illustrated by an original composition is given and the pupil executes it in any medium he desires. Students model in composite clay, first from simple objects, afterwards from the cast and life. Studio talks are given every month. An important feature is the sketch class, conducted exclusively by the students. Special classes for children are held twice a week.

The exhibition rooms and the studios are in Perkins Fine Arts Hall. Instruction is given in the morning from nine until one. The studios are open for work in the afternoon also, and all work is criticized. Several exhibitions of students' work are held during each year. The drawings receiving honorable mention on these occasions are retained for the annual exhibition.

All materials except easels and drawing boards are furnished by the students. Lockers are provided.

One year, six days a week in studio.....	$100 00
One half-year, six days a week in studio.....	60 00
One year, three days a week in studio	60 00
One half-year, three days a week.....	35 00

THE CUTLER ACADEMY.

Cutler Academy, named after the late Henry Cutler of Massachusetts, a generous and steadfast friend of Colorado College, provides a thorough preparation for any college in the United States. While the preparatory training is the principal aim, the plan of study is arranged to meet the requirements of students who do not propose entering upon college work. The course embraces four years, and the teaching is conducted by instructors many of whom are also engaged in the work of the College.

A student in Cutler Academy preparing for some other college than Colorado College, where the requirements for admission differ in some particulars, can by timely application to the instructors secure such modification of his course as will meet the necessities of his case.

With the completion of the new Palmer Hall (see p. 72) the building heretofore known as Palmer Hall has become the Cutler Academy Building.

Girls not residents of Colorado Springs are required to live in Montgomery Hall, the Academy dormitory.

Students enjoy the privileges of the Coburn Library, and may take the courses in Fine Arts and Music, on the same terms as students of the College.

Two literary societies are maintained, one by the girls, the other by the boys.

The athletic interests of the Academy are directed by a council composed of instructors, graduates and students.

Correspondence concerning the Cutler Academy should be addressed to the Principal.

THE CUTLER ACADEMY—FACULTY.

WILLIAM FREDERICK SLOCUM,
President.

M. CLEMENT GILE, Principal,
Latin and Greek.

LOUIS A. E. AHLERS,
French and German.

ERNEST BREHAUT,
Latin.

MARIANNA BROWN,
History and Latin.

MRS. WILMATTE PORTER COCKERELL,
Botany.

MELVILLE FULLER COOLBAUGH,
Chemistry.

ANNA PEARL COOPER,
English and History.

PHILIP FITCH,
Physics.

EDITH PRESTON HUBBARD,
Mathematics.

HOWARD MOORE,
Drawing.

ATHERTON NOYES,
Greek.

EDWARD C. SCHNEIDER,
Physiology.

HUGH A. SMITH,
French.

WILLIAM STRIEBY,
Chemistry.

MAUDE E. TAFT,
Medical Adviser for Girls.

ADMISSION.

Candidates for admission to the Cutler Academy are expected to have finished the eighth grammar grade in the public schools, or to have covered the equivalent of the following work:

Arithmetic—Franklin or Wentworth.

English—Reed and Kellogg's Higher Lessons.

History—Montgomery's United States History.

Geography—Any school Geography.

Applicants for admission who have, within six months, been students in the Colorado Springs High School, must present certificates from the High School showing completion of the work of the grade preparatory to the Academy class which they wish to enter. The High School will, upon payment of a small fee, provide special examinations for this purpose, if the regular examinations were not passed. The Academy will not examine such applicants, except upon subjects which were not included in the High School course.

Candidates for admission in 1904 should present themselves on Tuesday, May 31, or Tuesday, September 6, at 9 A. M., Each applicant must bring a certificate of good moral character and a full written statement of studies pursued elsewhere. Any student whose influence is felt to be injurious to good scholarship or good morals, will not be permitted to remain in the Academy.

COURSES OF INSTRUCTION.

CLASSICAL COURSE.

FIRST YEAR.

		HOURS PER WEEK
FIRST HALF.	*Latin:* Comstock's First Latin Book	6
	Algebra: Through Fractions	6
	English: Review of Grammar (Carpenter); composition work	4
	Required Supplementary Readings, see p. 69.	
	History: Roman	2
		18
SECOND HALF.	*Latin:* First Latin Book completed; Allen and Greenough's Latin Grammar; Cæsar, Book I; reading at sight	6
	Algebra: Through Radicals and easy Quadratic Equations	6
	English: Composition work	4
	Required Supplementary Readings, see p. 69.	
	History: Greek	2
		18

SECOND YEAR.

FIRST HALF.	*Latin:* Allen and Greenough's Latin Grammar; Cæsar; prose composition; reading at sight.	4
	Greek: Goodwin's Grammar; White's First Greek Book; Greek Reader	5
	English: Genung's Outlines of Rhetoric: choice of words, phraseology, special objects in style	3
	Required Supplementary Readings, see p. 69.	
	Geometry	3
	English History	3
		18

		Hours per week.
Second Half.	*Latin:* Grammar; Cæsar; Ovid, Stories from the Metamorphoses; reading at sight; prose composition	4
	Greek: Grammar; Greek Reader; Xenophon's Anabasis, Book I; reading at sight	5
	English: Genung concluded: The sentence, the paragraph, the whole composition, writing by means of outlines, methods of transition	3
	Required Supplementary Readings, see p. 69.	
	Geometry	3
	English History	3
		18

THIRD YEAR.

First Half.	*Latin:* Grammar; Cicero, Four orations against Catiline; reading at sight; prose composition	4
	Greek: Xenophon's Anabasis, 2 books; reading at sight; written translations; composition (Jones)	4
	Algebra and Plane Geometry	3
	English: George Eliot's Silas Marner, Scott's Ivanhoe, Goldsmith's Vicar of Wakefield, Shakespeare's Merchant of Venice and Julius Cæsar; Text: Painter's Introduction to English Literature	3
	Required Supplementary Readings, see p. 69.	
	Chemistry: Williams' Elements of Chemistry; laboratory practice. Fee, $6.00	4
		18
Second Half.	*Latin:* Grammar; Cicero, Orations for Archias, for Marcellus, and for the Manilian Law; reading at sight; prose composition	5
	Greek: Xenophon's Anabasis, 2 books or an equivalent; reading at sight; composition	5
	English: Shakespeare's Macbeth, Coleridge's Ancient Mariner, Lowell's Vision of Sir Launfal, Addison's Sir Roger de Coverley Papers; Text: Painter's Introduction to English Literature	3
	Required Supplementary Readings, see p. 69.	
	Chemistry: First half-year continued	4
		17

FOURTH YEAR.

		Hours per week.
FIRST HALF.	*Latin:* Grammar; Vergil, Æneid, Books I-III; reading at sight; prose composition	5
	Greek: Homer, Iliad, Books I-III; composition (Jones); reading at sight	5
	Mathematics: Review and general exercises	3
	English: Burke's Oration on Conciliation with America, Milton's L'Allegro, Il Penseroso, Comus and Lycidas; Newcomer's American Literature	2
	Required Supplementary Readings, see p. 69.	
	German, *French*, *Physics*, *Biology*, or *Freshman Mathematics*, (see p.)	4
		19
SECOND HALF.	*Latin:* Grammar; Vergil, Æneid, Books IV-VI, The Bucolics; reading at sight, prose composition	5
	Greek: Homer, Iliad, Books IV-VI, and Odyssey, Books I-III; written translations; composition	5
	Mathematics: Review and general exercises	3
	English: Tennyson's Princess, Carlyle's Essay on Burns, Macaulay's Essays on Milton and Addison; Newcomer's American Literature	2
	Required Supplementary Readings, see p. 69.	
	German, *French*, *Physics*, *Biology*, or *Mathematics* A	4
		19

SCIENTIFIC COURSE.

FIRST YEAR.

As in Classical Course.

SECOND YEAR.

FIRST HALF.	*Latin:* As in Classical Course	4
	Physiology: Martin's Human Body	4
	English: As in Classical Course	3
	Geometry	3
	English History	3
		17

SECOND HALF.	*Latin*	4
	English:	3
	Geometry	3
	History: As in first half-year	3
	Botany	4
		17

THIRD YEAR.

FIRST HALF.	*Latin:* As in Classical Course, or *French* or *German*	4 or 5
	Chemistry: As in Classical Course	4
	Algebra and Plane Geometry: As in Classical Course	4
	English: As in Classical Course	3
	Free Hand or *Mathematical Drawing* (4)	2
		17 or 18
SECOND HALF.	*Latin* or *French* or *German:* First half-year continued	4 or 5
	Chemistry: As in Classical Course	4
	Solid Geometry: As in Classical Couree	4
	English: As in Classical Course	3
	Drawing: First half-year continued (4)	2
		17 or 18

FOURTH YEAR.

		Hours per week.
FIRST HALF.	*Latin* 5, or *French* 4 (or *German* 4) and *Mechanical* or *Free Hand Drawing* (2) 1	5
	Physics: Text Book and Laboratory practice	4
	Review Mathematics: As in Classical Course	3
	Mathematics A (see p. 41) or *Chemistry* B (see p. 43)	3 or 4
	English: As in Classical Course	2
		17 or 18
SECOND HALF.	*Latin* or *French* (or *German*) and *Drawing:* First half-year's work continued	5
	Physics: First half-year continued	4
	Review Mathematics: As in Classical Course	3
	Mathematics A or *Chemistry* B, first half-year continued	3 or 4
	English: As in Classical Course	2
		17 or 18

HONORS.

Scholarship Honors of two grades are awarded at Commencement for excellence in the work of the year. The Honor list for 1902-03 was as follows:

HIGH HONORS.

CARL B. LEHMANN, '04.

CALLIE BERNARD, '05.

HONORS.

HARVEY EZRA BOATRIGHT, '03.

EBENEZER IRISH, '03.

JOHN MACARTHUR MAGUIRE, '04.

FRANK C. MERRIELL, '04.

HAROLD ROBERTS, '04.

GEORGE F. KNIPPRATH, '06.

REQUIRED SUPPLEMENTARY READINGS IN ENGLISH.

First Academy: Macaulay's Lays of Ancient Rome; Hawthorne's Wonder Book and Tanglewood Tales; Æsop's Fables; Gulliver's Travels; Arabian Nights; Scott's Kenilworth; Dickens' Oliver Twist; Hughes' Tom Brown at Rugby; Kipling's Jungle Books; Kingsley's Water Babies; Tennyson's Enoch Arden; Lamb's Tales from Shakespeare.

Second Academy: St. Pierre's Paul and Virginia; Lanier's The Boy's King Arthur; Longfellow's Tales of a Wayside Inn; Irving's Tales of a Traveler; Dickens' Christmas Carol; Lanier's The Boy's Froissart; Bryant's Iliad; Scott's Talisman; Kingsley's Westward Ho; Hawthorne's Twice Told Tales; Brown's Rab and His Friends.

Third Academy: Scott's Marmion and Lady of the Lake; Shakespeare's Twelfth Night and Richard II; Irving's Conquest of Granada; Scott's Quentin Durward and Peveril of the Peak; Bulwer's The Last Days of Pompeii; Plutarch's Lives of Themistocles and Alcibiades; Fisk's War of Independence; Thackeray's Newcomes.

Fourth Academy: Palmer'sOdyssey (or Leaf's Iliad); Matthew Arnold's Sohrab and Rustum; Scott's Guy Mannering and The Heart of Midlothian; Blackmore's Lorna Doone; Curtis' Prue and I; Saintine's Picciola; Jane Austen's Pride and Prejudice; Fiske's Critical Period of American History.

LOCATION.

Colorado College is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Founded in 1871, under the direction of men of shrewd foresight and broad views, it has maintained from the beginning high standards of morality and culture. Saloons and the attendant destructive influences are absent. Radiating railroad systems and the recent development of neighboring gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers, but the invalids are so far outnumbered that the place has none of the depressing influence so often observed at noted health resorts. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous canons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the opportunity for outdoor exercise afforded by the great number of fine days and the dryness and rarity of the air, helpful in cases of malarial disease, asthma, and incipient phthisis. Students unable to work in other climates may here continue their studies while at the same time making a permanent gain in health.

COLLEGE BUILDINGS.

The buildings of the College are situated on a tract of about 50 acres, in the heart of the best residence portion of the city.

Cutler Hall (formerly Palmer Hall), the oldest building on the campus, was first occupied in 1880. It contains lecture rooms, and chemical, physical and biological laboratories. It is now entirely devoted to the use of Cutler Academy.

The Library, given in 1894 by the late Mr. N. P. Coburn of Newton, Mass., and erected at a cost of $50,000, is of great architectural beauty and admirably adapted to its purpose. It is of the "Peach Blow" sandstone of Colorado, and its roof is of red tile with copper mountings. The interior, with its ceiling twenty-six feet high, its red oak woodwork, its picturesque galleries, its inviting alcoves, its great stone fire-places, is exceedingly attractive. Long arched windows extend from floor to ceiling. A full-sized cast of the "Winged Victory" of Samothrace stands at one end of the main hall. In recesses are marble busts of Antinous and Dante, and casts of the Hermes of Praxiteles and of Mercie's David. Mr. A. L. Dickerman's collection of rare and valuable Indian curiosities adds to the interest of the room.

The President's Residence, at the northern boundary of the campus, was purchased by the Trustees in 1888, and was remodeled in 1903.

The Astronomical Observatory is the gift of Henry R. Wolcott, Esq., of Denver, and was completed in 1894. On the lower floor are a lecture room, a transit-room, and a photographic dark room. Here also are the registering

instruments of the College Meteorological Station. Up stairs is the dome room, containing an equatorial telescope.

THE GYMNASIUM, built by the students of the College in 1891, contains a useful assortment of apparatus. See "Physical Training," p.

THE PERKINS FINE ARTS HALL, named for one of the principal donors, the late Willard B. Perkins, of Colorado Springs, was completed in 1900. It is a two-story stone building, erected at a cost of $30,000. The lower story is a large auditorium, seating 600, in which the chapel exercises are held and concerts and lectures are given. This room contains a valuable pipe organ, given by Miss Elizabeth Cheney, of Wellesley, Mass., in memory of her brother, Mr. Charles P. Cheney. In the hallway stands a bronze statue of the Flying Mercury. The upper story contains the studios and lecture rooms of the Department of Fine Arts and the practice rooms for courses in Music. On the walls of the upper hall is a valuable collection of Japanese prints, presented by Mr. James F. Burns.

PALMER HALL, completed in the fall of 1903, at a cost of $270,000, contains the offices of administration ad labor-
$270,000, contains the offices of administration and labor-
atories for scientific work in all departments. It is two hundred and eighty-seven feet long with a depth from north to south of ninety-five feet. Besides a sub-basement six feet high, there are three stories, a basement and a first and second floor. The style of architecture is that which has been chosen for the entire system of buildings eventually to occupy the College reservation, the first example of which was presented in the Coburn Library. The structure is fireproof, with steel frame and concrete floors, overlaid with terazzo finish. In the basement are laboratories for Chemistry, Physics and Psycho-physics, and a large demonstration

room. On the first floor are to be found the offices of administration, general lecture rooms, and other laboratories for Chemistry and Physics. The second floor contains the laboratories and lecture rooms for Biology, Geology and Mineralogy, and a large, well-lighted Museum for the natural science collections of the College. The building is being equipped at a cost of $50,000.

On the walls of the room devoted to the use of the Trustees and Faculty are hung a few choice paintings, which, it is hoped, are the nucleus of a large collection—Mr. Leslie J. Skelton's "Meadow-land, Montigny, France," a picture by Iwill, and two paintings by Mr. Harvey Young, "Crystal Lake, California," and "La Sal Mountains."

COLLEGE RESIDENCES.

HAGERMAN HALL is a substantial stone building, built in 1899, and used as a home for young men. Besides the students' rooms, which are well lighted and attractive, it contains a dining room, accommodating one hundred and fifty persons, now used by a young men's boarding club, and the Y. M. C. A. reading room. On the roof are most of the instruments of the Meteorological Station, and these are connected by a subterranean cable with the electric registering apparatus in the office at the Observatory.

MONTGOMERY HALL was erected and furnished in 1891 by the Woman's Educational Society, and presented free of debt to the College. It provides a comfortable home for young women. Its dining room is now used by a young women's boarding club.

TICKNOR HALL, the generous and beautiful gift of Miss Elizabeth Cheney, was opened as a home for the young women of the College in January, 1898. Its comfort and conveniences are the result of careful study of the most recently-built dormitories for women. Besides students'

rooms, it contains the College dining-room, drawing-rooms and guest-rooms, and a study-room, comfortably furnished and provided with reference books, for the use of all young women of the College, and an infirmary capable of complete isolation. The infirmary is open to all young women living on the campus, and is in charge of a trained nurse, whose services, whether in the infirmary or in the students' rooms, are paid for by an annual fee of $5.00 from each young woman. This fee is due in September.

McGregor Hall, a commodious and convenient building, was opened in September, 1903, for use as a third residence for young women.

No young woman will be received into the halls who is less than sixteen years of age, and who is not taking at least fifteen hours' work or its equivalent. After all vacancies in the halls are filled, suitable rooms in the vicinity may be secured subject to the approval of the Dean of Women.

All the foregoing College buildings, except the Gymnasium, are of stone. Heat and electric light are furnished to all from a central plant.

LIBRARY.

MALCOLM G. WYER, LIBRARIAN.

The Library building has been elsewhere described (See p. 71. In it are about thirty thousand volumes and as many pamphlets. The leading literary and scientific journals are received, as are also the United States Government publications and those of the State of Colorado. Of United States documents the library now has about five thousand volumes, including the records of Congress complete from 1847, and many valuable records for the period 1774-1837. These doc-

uments are arranged on the plan adopted in the library of the Superintendent of United States Documents at Washington.

The Medical Alcove was originated in 1894, when the late Dr. B. F. D. Adams, of Colorado Springs, presented to the College his extensive medical library. The El Paso Medical Society contributes the transactions of Medical Societies and standard works purchased by the Society. In 1896 the collection was enlarged by the gift of two hundred and fifty volumes and three hundred pamphlets from the late Dr. E. C. Kimball, of Colorado Springs.

In 1896 the control of the Library was vested in a board of twenty-five, composed of members of the Faculty and the Board of Trustees and of persons not otherwise connected with the College, and the Library was opened to residents of the city. All the privileges of the Library, including the use of current magazines and periodicals, are open to the public on payment of the fee required of College students. The Library is open from 8 A. M. to 6 P. M.

The Coburn Library Book Club, organized in 1897, provides its members with the best new books, which are given to the Library after twelve months. The fee is $5 a year or $2 for three months. Members enjoy the full privileges of the Library. The Club has purchased about eighteen hundred books, of which nearly fifteen hundred have been given to the general Library. The College Women's Club has recently given the nucleus of a collection of books on pottery. The Wednesday Art Club and the local Chapter of The Daughters of the American Revolution have also started collections of books on their special topics. In the Library building is a reading room, where the current literary and scientific magazines, as well as a number of leading newspapers, may be consulted.

LABORATORIES AND APPARATUS.

THE PHYSICAL LABORATORIES occupy eleven rooms in the basement and first story of Palmer Hall. They include a large room for elementary physics, an apparatus room, a shop and a phòtometer room, a constant temperature room, a large electrical laboratory, and several rooms for individual work. The equipment has been greatly increased during the present year. A few of the chief pieces added are a Gaertner chronograph, a tuning-fork apparatus for determining "g" with Atwood's machine attachment, a ballistic pendulum, a Kater's pendulum, vapor density apparatus, an air thermometer, inertia apparatus, etc. A number of pieces of apparatus have been made from the professor's designs by Mr. E. J. Hoff, of Colorado Springs.

THE BIOLOGICAL LABORATORIES consist of eight thoroughly lighted and convenient rooms on the second floor of Palmer Hall. There is an abundant supply of microscopes, micrometer-eye-pieces, cameras, dissecting microscopes, etc., and all glassware necessary for the various general courses. The physiological laboratory is supplied with the Harvard apparatus and haemocytometer, haemometer, cardiograph, sphygmograph, stethoscope, etc. For physiological botany, such apparatus as the clinostat, auxinometer, etc., is in the laboratory. All needed sterilizers, incubators, etc., are on hand for work in bacteriology.

THE CHEMICAL LABORATORIES include: (1) The General Laboratory; (2) The Qualitative Laboratory; (3) The Quantitative Laboratory; (4) The Organic Laboratory; (5) The Assay Laboratory. In these rooms special attention has been given to ventilating and lighting. The ceilings are high, the floor space for each student is large. Convenient working desks, each under separate combination locks, and

all needful laboratory appliances, afford to the student unusual facilities for rapid and accurate experiment. For the equipment of the smaller rooms, fine balances, spectroscope, polariscope, photographic and combustion apparatus, etc., have been ordered. The assay laboratory will be ready for use next fall, when the Junior work of the course in Mining Engineering will be given for the first time. The furnaces of this laboratory are now in process of construction. Adjacent to the assay laboratory is a room which will be equipped for crushing, sampling and pulverizing ores, and for the parting of bullion. Store rooms and preparation rooms are conveniently connected with all laboratories.

The Mechanical Laboratories were equipped during the fall of 1903. See p. 59.

The Geological Laboratory in the second story of Palmer Hall, provides facilities for forty students. The laboratory work in general geology consists in the preparation of maps and models and in the determination of the commoner rocks and minerals, together with practice in the identification of important index fossils. Synoptic collections and relief models are provided for the use of students in the introductory course. A large amount of museum material is available for illustrating the course in vertebrate and invertebrate paleontology. The petrographical and mineralogical collections include all the chief types of rocks and minerals.

The Observatory has a telescope of four inches aperture, presented by Mr. Henry R. Wolcott, of Denver, a transit instrument and a sidereal clock, both given by Mr. Charles S. Blackman, of Montreal, Canada.

A Meteorological Observing Station is maintained by the College, and daily records are made and reported to

the United States Weather Bureau. A monthly report is also made to the Health Department of Colorado Springs.

The Station has received during the year an important gift from General Palmer, and has now the apparatus usually found at the stations of higher grade connected with the United States Weather Bureau. Besides these, some instruments of German manufacture, intended for the accurate determination of the moisture of the atmosphere, are on the way. Among the instruments already installed the most important is the quadruple register, manufactured by Julien P. Friez of Baltimore ,and recording electrically on a single sheet the direction and velocity of wind, the duration of moisture, and the amount of rainfall.

MUSEUM.

T. D. A. COCKERELL, CURATOR.

An excellent foundation for a Museum was early laid by the gifts of Prof. J. H. Kerr, Rev. E. N. Bartlett, Dr. E. P. Tenney, and Mr. George Fowler, and by the purchase of mineral and botanical collections from the Rev. R. T. Cross, and Prof. Marcus E. Jones, respectively. The gifts in geology and zoology by Professor Kerr, donor of some two thousand specimens, were destined to be of special value, the former including as their central feature the Ward "College Collection" of over 600 representative minerals and rocks.

By far the largest and most important contributions to the Museum are the W. S. Stratton donation and the collection given by General William J. Palmer and the Colorado Springs Company. Through the generosity of Mr. Stratton large natural history collections, formerly at Coronado Beach, were secured in 1900. They include a large

collection of mammals and birds; a superb and very extensive collection of minerals, common, commercial and rare; and a collection of casts and restorations of fossils, particularly of the more remarkable of the extinct vertebrata. A few of the more noteworthy specialties are a group of all the known genera of marsupial mammals, a group of mounted orang outangs, the cast of megatherium cuvieri a gigantic ground-sloth, a complete mounted skeleton of one of the largest whales, and a restoration of the mammoth of the Ice Age.

In 1896 General William J. Palmer and the Colorado Springs Company purchased for the College the large paleontological cabinet of Professor Cragin, consisting of some eight thousand specimens from Colorado, Kansas, Indian Territory, Texas and other states. It contains some mineral and zoological specimens, but is chiefly valuable for its paleontological material, which includes remains of Pliocene horses, llamas, Miocene rhinoceroses and mastodons, Cretaceous saurians, Tertiary fishes, and a large series of shells, echinoderms, and other invertebrates from the lower Cretaceous. It is of importance, not only as supplying a large part of the geological record not otherwise represented in the museum, but also as being the elaborated result of years of research and containing the types of many new species and some new genera of fossils, both invertebrate and vertebrate. Among these type-fossils, the most important is the large plesiosaurian reptile *Trinacromerum*, the type of a new genus and species described from the Cretaceous of Kansas in 1888.

Valuable recent contributions to the Museum are the collection of fossil invertebrates, chiefly Tertiary mollusca from the Atlantic slope, presented by Professor William B. Clark, of Johns Hopkins, State Geologist of Maryland, and

the Educational Series of Rocks received from Mr. Charles D. Walcott, Director of the United States Geological Survey. The latter is a systematic collection of unaltered and metamorphic rocks, including those of mechanical, chemical, organic and igneous origin, together with a few specimens illustrating special geological processes. It includes 156 numbers, prepared and catalogued by Mr. Joseph S. Diller, of the Survey.

In addition to those already mentioned, the Museum equipment in geology includes collections of rocks from the Cripple Creek mining district, presented by Professor George H. Stone, and from New Hampshire (the N. H. Geological Survey Series), one of minerals from Lake Superior, the Rufus M. Bagg collection of Foraminifera, and many miscellaneous specimens. In Zoology, the Museum has useful collections in sponges, corals, echinoderms, mollusks and birds, with small herpetological and osteological collections, and some material in other groups.

The Museum is now in process of arrangement in a room in Palmer Hall, 116½ feet long by 42 feet wide and 26 feet high. It is expected that one-third of the collection will have to be stored for lack of exhibition room.

The first number of a Museum Bulletin, treating of the Colorado Rubber Plant (Picradenia), has appeared.

RELIGIOUS LIFE.

The College is distinctly Christian, and recognizes Christian character as the highest attainment. It is unsectarian in its management. Inquiry is made of the students at entrance, as to their denominational affiliations, and what churches in the city they desire to attend; lists are sent to the pastors of these churches, who seek out the students

and bring about them the influence of church homes. Morning prayer is held in the chapel daily, attendance upon which is required of all students. Occasionally the service is shortened for the President's ethical talk, in which he discusses questions bearing directly on student life.

Occasional Vesper services are held in the chapel, conducted by clergymen of various denominations. The Day of Prayer for Colleges is marked by appropriate observance. The weekly prayer meetings on Sunday afternoons and Friday evenings are in charge of the student organizations.

The Young Men's and the Young Women's Christian Associations are represented by strong branches, under the auspices of which are conducted mission work at home and abroad, and classes for Bible study. These Associations send delegates to all the state and national conferences. The Student Volunteer movement is also represented. Of the former members of the band, some are continuing in other institutions their preparation for the foreign field, and others are already actively engaged in missionary work.

At the beginning of the College year members of the Associations meet all trains and welcome new students.

STUDENT PUBLICATIONS.

The *Tiger,* a weekly newspaper, is issued by an editorial board composed of College students. An *Annual* is published in May by the Junior class. A *Handbook* of information is issued at the beginning of the College year by the Y. M. C. A.

LITERARY SOCIETIES.

The Oratorical and Debating Association has charge of oratorical and debating contests. All students of the College are members of the Association, and may compete in the oratorical contest or for a place on the intercollegiate debating team.

The Apollonian Club, the Pearsons Literary Society and the Miltonian Club, composed of young men, and the Minerva Society, the Contemporary Club and the Hypatia Society, composed of young women, hold weekly meetings for debate and other literary work.

COLORADO COLLEGE SCIENTIFIC SOCIETY.

The Colorado College Scientific Society was organized in 1890. Its objects are: "The discussion of recent scientific results, the promotion among its members of scientific inquiry and investigation, and the publication of the more important papers read at the meetings." Ten annual publications, entitled "Colorado College Studies," have been issued, and a large number of exchanges have been secured from associations of a like nature, including several foreign societies. The attention which the "Studies" have received from scientific men everywhere encourages the Society to continue this publication. The contents of Volume Ten are as follows:

The Earliest Life of Milton.—*Professor E. S. Parsons.*

La Femme dans les Chansons de Geste, concluded.—*Professor H. A. Smith.*

An Interferometer Study of Radiations in a Magnetic Field.—*Professor John C. Shedd.*

Students are encouraged to attend the monthly meetings of the Society.

The Secretary of the Society, to whom all correspondence, exchanges, etc., should be addressed, is Dr. Florian Cajori.

OFFICERS OF THE ALUMNI ASSOCIATION.

Clarence R. Arnold, '91	President.
Melville F. Coolbaugh, '02	Vice President.
Willis R. Armstrong, '99	Secretary.
Lillian Johnson, '99	Treasurer.

COLLEGE LECTURE COURSE.

Since 1894 courses of lectures and single addresses have been given in Colorado Springs and other cities in the State. It is the purpose of the College to expand this work, as facilities and opportunities increase.

The following lectures are among those that form the programme for 1903-1904:

Professor Lancaster:
- The Relation of Psychology to Education.
- Nature Study in the Public Schools.

Professor Finlay:
- The Northwestern Rockies in Montana.
- The Yellowstone National Park.
- The Canon of the Colorado in Arizona.
- The Massachusetts Coast.

Mr. Cockerell:
- Evolution and Human Progress. (2 lectures.)

Mr. Betjeman:
- The Negro Question.
- Irrigation and its Immediate Effect on Colorado.

Professor Schneider:
- On Health, Old Age, and Disease.
- Predisposing Causes of Disease.

Professor Parsons:
- The Isle of Wight.

GLEE CLUBS.

The College Glee and Mandolin Club is in its seventh year, and is under the direction of Mr. Clarence W. Bowers of the Musical Faculty. The Club gave concerts this year in the following places: Pueblo, Rocky Ford, La Junta, Las Vegas, Albuquerque, Santa Fe, Trinidad, Canon City, Buena Vista, Leadville, Grand Junction, Delta, Ouray, Eaton, Greeley, Denver and Colorado Springs.

The Young Women's Glee Club, under the leadership of Mr. Jessop, is now in its sixth year and is doing admirable work.

SPECIAL STUDENTS.

Special students will be received, at the discretion of the Faculty, into such classes as they are qualified to enter. It is the rule of the College that such students must attend the examinations as well as the ordinary recitations of their classes, subject to the same conditions as other students.

Several of the courses of lectures which form part of the College instruction, particularly in the department of Philosophy, are open to the public on payment of a small fee, and without any requirement of examination.

EXPENSES.

Tuition by the year	$35 00
Matriculation fee	5 00
Library Fee	3 00
(From the above named fees there is no rebate in case of withdrawal.)	
Board in Montgomery Hall (club for young women), a week	2 50
Board in Hagerman Hall (club for young men), a week	3 00
Board in Ticknor Hall (college table), a week	4 00
Rooms warmed, furnished and lighted, by the year, for each occupant $40 00 to	80 00

The number of rooms under $80 is limited. Application should be made early. Rooms are rented by the year, and will be retained for incoming students only when the application is accompanied by a deposit of $5. This fee will be credited on the bills for room rent, and will be refunded only in case the room is given up by September first.

Students are required to furnish towels, bed linen and blankets.

Fees of the College physician:

Office consultation	$ 50
Visits to rooms	1 00

For prolonged illness and in case of contagious disease, a special nurse is employed, and the expenses are charged to the patient.

COLLEGE BILLS.

The bills for tuition and room rent are issued at the beginning of each half-year, and are payable immediately. Students who withdraw before the end of the term pay full tuition. Students who withdraw less than six weeks before the end of the term pay full room rent. Board bills are payable monthly, in advance, and no rebate is made for absences of less than a week.

SCHOLARSHIPS.

The income of the following scholarships is devoted to the aid of worthy students who may need assistance in completing their course, and who, by their scholarship and character, prove themselves worthy of such assistance.

The Thomas Davee Scholarship of $500, established by the late Mrs. T. V. D. Mitchell, of West Minot, Maine.

The Rice Scholarship of $700, established by friends of the Rev. Chas. B. Rice, D. D., of Danvers, Mass.

The Currier Scholarship of $1,000, founded by the late Hon. Warren Currier, of St. Louis, Mo.

The Edwards Scholarship of $500, given by the Congregational Church of Wellesley Hill, Mass.

The Mary Caroline Quincy Scholarship of $500, given by the late George Henry Quincy, of Boston, Mass.

The Lawrence Myers Scholarship of $1,000, and the Lucy Platt Myers Scholarship of $1,000, given by Mrs. Laetitia M. Myers, of Plainfield, New Jersey.

The Fay Scholarship of $1,000, founded by the late Eliza A. Fay, of Boston, Mass.

A Scholarship of $1,000, given by Mr. William F. Richards, of Newport, N. H., through the Woman's Educational Society of Colorado College.

The Willard B. Perkins Scholarship of $7,000. The second Willard B. Perkins Scholarship of $7,000. These two scholarships were given by the late Willard B. Perkins, of Colorado Springs.

The Hawley Scholarship Fund, now amounting to about $10,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships of such young women of the College as the Faculty may recommend, preference being given to those who are fitting themselves for Christian work. This year six scholarships are offered from this fund.

The Hawley Memorial Fund, now amounting to about $7,500, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., in memory of her husband, Mr. Martin Hawley, the annual income of which is loaned to "worthy

and deserving students of the College, as the Faculty may see proper."

The Strettell Memorial Fund of $2,000, given by Mrs. Alma G. V. Harrison, of London, England, and General William J. Palmer, of Colorado Springs, in memory of Mr. Arthur E. V. Strettell, Mrs. Harrison's brother, who died in Colorado Springs in 1882. The income of this fund is to be used to aid students suffering from lung troubles.

The Mary G. Slocum Scholarship of $100 a year, given by the Woman's Educational Society of Colorado College. This scholarship is awarded on the basis of competition to young men of the Junior Class.

The C. C. Hemming Scholarship of $225 a year, given by Mr. C. C. Hemming of Colorado Springs, is open for competition to the young men of the Junior Class of the College of Liberal Arts. The award is made on the basis of scholarship, character and general fitness. The recipient shall have been for two years a regular student in the College, shall return for his Senior year, and shall have expressed his determination to graduate. The holder of the Perkins Scholarship shall not be eligible.

The Ruth Dayton Scholarship of $1,000, established by Mrs. Emma Danforth Wiley, of Colorado Springs.

Several other scholarships are supported by annual subscription.

Self-Support.—Advanced students of high standing have occasional opportunities for private teaching. Capable and faithful young men can often find work in town. A limited amount of service in Montgomery and Ticknor Halls is offered to young women. This is not often available for first year students.

PRIZES.

The Hastings Prizes.—The sum of $1,000 has been given by Mr. F. R. Hastings, of Colorado Springs, the income of which is to be used in providing prizes for the best two theses written by students in the course on the Evolution of Religious Thought.

The Loyal Legion and Grand Army Prizes.—These prizes are offered by members of the Loyal Legion and of the Grand Army of the Republic for excellence in oratory. The contest is open to members of the young men's literary societies, and is held on Decoration Day.

THE COLORADO COLLEGE PARK ASSOCIATION.

During the last two years the Colorado College Park Association has expended $8,500 in parking the campus. General William J. Palmer has provided for the maintenance of the park for five years by an annual contribution of $1,000.

THE WOMAN'S EDUCATIONAL SOCIETY.

This Society was formed in April, 1889, by the women of Colorado Springs. Its purpose, as expressed in its constitution, "is to give physical, intellectual and spiritual aid to students in any department of Colorado College." This Society built Montgomery Hall, furnished Ticknor and McGregor Halls, and has been of service in many ways to the College. Its members endeavor to come into personal relations with the students, especially with those who are supporting themselves; they try to find work for them and

by friendly advice assist them in their efforts to secure an education. Loans are made on the following conditions:

First—Loans may be made to students who have been in the College for one term and are recommended by the Faculty as in every way deserving of such aid.

Second—No student shall be allowed to incur an indebtedness to the Society of more than $300.

Third—Students may receive loans without interest until their connection with the College ceases; after that time their notes shall draw interest at 4 per cent.

For the scholarships within the gift of the Society see pp. 85-87.

The officers for the current year are:

President—Mrs. William F. Slocum.
First Vice-President—Mrs. John R. Hanna.
Second Vice-President—Mrs. Francis W. Goddard.
Third Vice-President—Mrs. L. A. E. Ahlers.
Recording Secretary—Mrs. W. E. Fette.
Corresponding Secretary—Mrs. Edward S. Parsons.
Treasurer—Mrs. Florian Cajori.
Auditor—Miss Priscilla Sater.

HOSPITAL FUND.

The Trustees of the Bellevue Sanitarium have given to the College nearly $4,000 as the nucleus of a hospital fund for the students.

THE NEEDS OF THE COLLEGE.

Colorado College, never more truly than to-day, has great and pressing needs. The College stands upon a firm financial basis; but greater facilities in the way of equipment are an immediate necessity. The Trustees and Fac-

ulty feel it imperative that the opportunity for service which lies before the College, and the conditions by which this opportunity can be embraced, be understood. The urgent demands of the hour should be realized, not only by those who in previous years have nobly aided the College, but by all persons who are interested in the cause of learning, in the progress of science, and in the growth and development of the best educational institutions as a safeguard for republican government. Among the needs which force themselves upon attention are the following:

General Endowment.—The growth of the College has been so great that an increase of one million dollars in its endowment fund is seriously needed.

Endowment of Professorships.—It is greatly to be desired that the chairs in the various departments be permanently endowed. The need has come to be urgent by reason of the rapid growth in numbers and the consequent demands for instruction and for more complete courses.

Funds for the Library.—The permanent fund for purchasing books is too small, and both the regular work of the College and the value of the Library to the city are seriously hampered by this limitation. The College appeals earnestly to lovers of books for money to use for this purpose, either to be added to the permanent fund or to be immediately expended.

Special Funds for Scientific Research.—Money to be devoted to scientific work in special lines is very greatly needed. The opportunities of Colorado College in this direction are unusual, because of the geographical, meteorological and geological situation. The attention of those interested in the advancement of science is earnestly called to this fact.

Physical Apparatus.—The Physical Laboratory and the Observatory possess some good apparatus, but a great deal more is needed for the most effective work in advanced classes and for the purpose of original investigation. With a few thousand dollars our facilities could be immensely enlarged.

Funds for the Engineering School.—This department of the College needs a considerable sum of money to be immediately expended in the proper development of its work and also a large endowment fund to secure its stability and future growth. Large gifts bestowed for these ends will directly aid in the development of the rich resources of Colrado and the adjoining mountain states.

Residence Hall.—It is hoped that the young men may soon be provided with another residence hall, as the need is most pressing.

Scholarship Funds.—The Trustees desire to emphasize the fact that many young people in a new country are obliged to earn their education by hard and self-denying work. Colorado College needs a large addition to her scholarship funds. Money thus applied tends directly to the profit of the individual and of the country.

Infirmary Building.—The Infirmary in Ticknor Hall, which is available for young women only, is inadequate for the growing needs of the College. A separate building, in which contagious diseases can be cared for as well as ordinary cases of illness, is a necessity.

Endowment of the Infirmary.—During the past year a fund has been started for the endowment of a cot to provide for illness among students who are working their way. Additions to this fund are an urgent need.

FORMS OF BEQUEST.

Those who intend to devise property to Colorado College, or to the Woman's Educational Society, are requested to employ one of the following Forms of Bequest:

"I hereby give, devise and bequeath unto The Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

"I hereby give, devise and bequeath unto the Woman's Educational Society of Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

If property other than money is willed, the form should be correspondingly varied.

(Col H)
THE
JOHN CRERAR
LIBRARY

COLORADO COLLEGE

1905

COLORADO COLLEGE STUDIES

Bulletin Series, No. 31 General Series, No. 15

Entered at the Post Office, Colorado Springs, as Second Class Matter

THIRTY-FIRST ANNUAL BULLETIN

OF

COLORADO COLLEGE

COLORADO SPRINGS, COLORADO

1905

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Calendar

1905.

Feb.	22	Wednesday	Washington's Birthday: a holiday.
April	18	Tuesday	Last day for registering for Hawley and Mary G. Slocum scholarships.
April	19	Wednesday	Easter Recess begins at 1 p. m.
April	27	Thursday	Easter Recess ends at 8:15 a. m.
May	26	Friday	Examinations begin.
May	30	Tuesday	Memorial Day; a holiday.
June	4	Sunday	Baccalaureate Sermon.
June	6	Tuesday	Class Day.
June	7	Wednesday	Commencement.
Sept.	12	Tuesday	Residence Halls open.
Sept.	13	Wednesday	First Half-Year begins at 8:15 a. m.
Nov.	7	Tuesday	Election Day; a holiday.
Nov.	15	Wednesday	Insignia Day.
Nov.	30	Thursday	Thanksgiving Day; a holiday.
Dec.	22	Friday	Christmas Recess begins at 5 p. m.

1906.

Jan.	9	Tuesday	Christmas Recess ends at 8:15 a. m.
Jan.	22	Monday	Mid-year Examinations begin.
Jan.	26	Friday	Trustees' Day.
Jan.	29	Monday	Second Half-Year begins at 8:15 a. m.
Feb.	11	Sunday	Day of Prayer for Colleges.
Feb.	22	Thursday	Washington's Birthday: a holiday.
April	10	Tuesday	Last day for registering for Hawley and Mary G. Slocum scholarships.
April	11	Wednesday	Easter Recess begins at 1 p. m.
April	19	Thursday	Easter Recess ends at 8:15 a .m.
May	30	Wednesday	Memorial Day: a holiday.
June	4	Monday	Examinations begin.
June	10	Sunday	Baccalaureate Sermon.
June	12	Tuesday	Class Day.
June	13	Wednesday	Commencement.

Historical Statement

Colorado College is the oldest institution of higher education in the State. In 1874, while Colorado was yet a territory, a College upon a broad Christian foundation was established in Colorado Springs. The authorized announcement for that year contains the following:

"It is the purpose of the Trustees to build a College in which liberal studies may be pursued under positive Christian influences. . . . The College is under no ecclesiastical or political control. Members of different churches are on its Board of Trustees. . . . The character which is most desired for this College is that of thorough scholarship and fervent piety, each assisting the other, and neither ever offered as a compensation for the defects of the other."

From the beginning the Board of Trustees has been composed of leading professional and business men of Colorado, together with a few Eastern men of similar standing, and has ever been animated by the purpose avowed by the original Board.

A grant of land had been made in advance of the organization of the College, in 1873, by the Colorado Springs Company, the founders of the City of Colorado Springs. The Rev. Jonathan Edwards was the first professor and executive officer. The first President, the Rev. James Dougherty, was elected in 1875, and was succeeded in the following year by the Rev. E. P. Tenney. From 1885 to 1888 there was no President, but the work of teaching was carried on without interruption. At this time there was only one building on the campus, Palmer Hall, now known as Cutler Academy, erected in 1880.

In the autumn of 1888 William Frederick Slocum was elected President. The faculty was at once enlarged, the courses reorganized, and Cutler Academy incorporated as an associated preparatory school, in which students have since been trained, not only for Colorado College, but for all the leading institutions of the United States. Within the following two years $100,000 was given toward

endowment, entirely from within the State of Colorado. Hagerman Hall was built in 1889. In the same year the Woman's Educational Society was organized and began the work of building Montgomery Hall. In 1890 the Colorado College Scientific Society was founded, and the first number of its publication, "Colorado College Studies," was issued.

Within the past fifteen years the endowment has been raised to $400,000 and the growth of the College in numbers has been equalled by an appropriate enlargement of equipment and activity. Among the marks of advance are the Gymnasium, built by the efforts of the students; the library building, given by the late N. P. Coburn; the Observatory, the gift of Henry R. Wolcott, of Denver; and Ticknor Hall, completed in 1897, as a second dwelling house for young women. The entire cost of this building, exceeding $23,000, was met by Miss Elizabeth Cheney of Wellesley, Mass. In 1900 the Perkins Fine Arts Hall was built at a cost of $30,000. The first floor is an auditorium, used for the religious services of the College and other public meetings; the second story is occupied by the Departments of Fine Arts and Music. McGregor Hall, a third residence for young women, was opened in September, 1903, and later in the same year, Palmer Hall was completed at a cost of $287,000, its equipment costing $50,000 additional. It contains the general offices of administration, recitation rooms, and the laboratories for scientific work in all departments.

At the beginning of the College year 1903-04 a School of Engineering was opened in connection with the College to meet the increasing demand in the Rocky Mountain region for instruction in applied science. The number of engineering students already enrolled has encouraged the Trustees to develop this department to the fullest degree of efficiency.

The growth of the institution in many directions and the steady elevation of its standards of work have won for it an assured position. It is able to offer to its students educational facilities of the same grade as are found at Eastern institutions of the higher learning.

Trustees

William F. Slocum, *President of the Board,* 24 College Place.

Willis R. Armstrong, - - - - - - 1415 N. Nevada Ave.

George W. Bailey, - - - 309 McPhee Building, Denver.

Rev. Edward H. Braislin, D. D., - - 2115 N. Cascade Ave.

John Campbell, - - - - - - - 1401 Gilpin St., Denver.

Robert F. Coyle, D. D., - - - 1650 Sherman Ave., Denver.

Rev. James B. Gregg, D. D., - - - - - - 9 E. Dale St.

J. J. Hagerman, - - - - - - - Roswell, New Mexico.

Thomas S. Hayden, - - - - 1637 Sherman Ave., Denver.

Irving Howbert, - - - - - - - - 17 N. Weber St.

William S. Jackson, - - - - - - - 230 E. Kiowa St.

William Lennox, - - - - - - 1000 N. Nevada Ave.

Horace G. Lunt, - - - - - - - 431 N. Cascade Ave.

William J. Palmer, - - - - - - Out West Building.

George Foster Peabody, - - - 54 Williams St., New York.

Philip B. Stewart, - - - - - - - - 1228 Wood Ave.

Mahlon D. Thatcher, - - - - - - Hill Crest, Pueblo.

Frank Trumbull, - - - - - - 1439 Franklin St., Denver.

Standing Committees of the Trustees

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College Officers

William F. Slocum, President.

Edward S. Parsons, Vice-President.

James B. Gregg, Secretary.

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Mrs. Philip B. Stewart
Rev. A. N. Taft
Mrs. A. E. Touzalin
Prof. T. K. Urdahl.

Faculty

WILLIAM FREDERICK SLOCUM, D. D., LL.D. 24 College Place.

President and Head Professor of Philosophy.

A. B. (Amherst), '74; B. D. (Andover), '78; LL. D. (Amherst), '93; LL. D. (Nebraska), '94; D. D. (Beloit), '01; LL. D. (Illinois College), '04; Colorado College, '88.

LOUIS A. E. AHLERS, A. M. 1428 Wood Ave.

Head Professor of Modern Languages and Literatures.

A. B. (Harvard), '94; A. M. (*ibid.*), '04; Colorado College, '95.

KURNAL R. BABBITT, LL. M. 1412 N. Cascade Ave.

Lecturer on Law.

LL. B. (Columbian Univ.), '88; LL. M. (*ibid.*), '89; Colorado College, '04.

ALFRED A. BLACKMAN, M. D. 801 N. Nevada Ave.

Medical Adviser.

M. D. (University of Denver), '02; Colorado College, '04.

ERNEST BREHAUT, A. M. 611 N. Tejon St.

Assistant Professor of Latin.

A. B. (Dalhousie), '94; A. B. (Harvard), '96; A. M. (*ibid.*), '97; Colorado College, '98.

FLORIAN CAJORI, PH. D. 1119 Wood Ave.

Head Professor of Mathematics.

S. B. (Wisconsin), '83; M. S. (*ibid.*), '86; PH. D. (Tulane), '94; Colorado College, '89.

CHARLES G. COLLAIS. 613 E. Cache la Poudre St.

Superintendent of Mechanical Laboratories.

*MELVILLE FULLER COOLBAUGH, B. S. 220 E. Cimarron St.
Instructor in Chemistry.
B. S. (Colorado College), '02; Colorado College, '02.

FRED CRABTREE, S. B. 723 N. Nevada Ave.
Professor of Mining and Metallurgy.
S. B. (Massachusetts Institute of Technology), '89; Colorado College, '04.

DONALD DEWITT, A. B. Hagerman Hall.
Instructor in Public Speaking.
A. B. (Colorado College), '03; Colorado College, '03.

GEORGE IRVING FINLAY, PH. D. 817 N. Cascade Ave.
Professor of Geology, Mineralogy and Paleontology
A. B. (Harvard), '98; PH. D. (Columbia), '03; Colorado College, '03.

M. CLEMENT GILE, A. M. 1121 N. Tejon St.
Head Professor of Classical Languages and Literatures.
A. B. (Brown), '83; A. M. (*ibid.*), '86; Colorado College, '92.

HENRY C. HALL, A. B., LL. B. 1401 Wood Ave.
Lecturer on Law.
A. B. (Amherst), '81; LL. B. (Columbia), '83; Colorado College, '03.

FREDERIC R. HASTINGS, A. M. 1501 Wood Ave.
Lecturer on the History of Philosophy.
PH. B. (Colorado College), '91; A. M. (*ibid.*), '92; Colorado College, '99.

ELIJAH CLARENCE HILLS, A. B. 1111 Wood Ave.
Professor of Romance Languages and Literatures.
A. B. (Cornell), '92; Colorado College, '02.

*On leave of absence, '04-'05.

EDITH PRESTON HUBBARD, A. B. McGregor Hall.
Instructor in Mathematics.
A. B. (Vassar), '01; Colorado College, '02.

RUTH LOOMIS, A. B. Ticknor Hall.
Dean of Women.
A. B. (Vassar), '85; Colorado College, '96.

FRANK HERBERT LOUD, PH. D. 1203 N. Tejon St.
Professor of Mathematics and Astronomy.
A. B. (Amherst), '73; A. M. (Harvard), '99; PH. D. (Haverford), '00; Colorado College, '77.

GEORGE JOHN LYON, B. Sc., C. E. Hagerman Hall.
Professor of Civil Engineering.
B. Sc. (Nebraska), '99; C. E. (Columbia), '04; Colorado College, '04.

HENRY McALLISTER, JR., B. L. 1231 N. Nevada Ave.
Lecturer on Law.
B. L. (Swarthmore), '92; Colorado College, '03.

HOWARD MOORE, C. E. 1140 Wood Ave.
Instructor in Drafting and Machine Design.
C. E. (Princeton), '93; Colorado College, '03.

ATHERTON NOYES, A. B. 10 E. Columbia St.
Assistant Professor of English.
A. B. (Yale), '85; Colorado College, '92.

MANLY D. ORMES, A. B., B. D. 1619 N. Cascade Ave.
Librarian.
A. B. (Yale), '85; B. D. (*ibid.*), '89; Colorado College, '04.

MARION EDWARDS PARK, A. B. McGregor Hall.
Instructor in Greek and Latin.
A. B. (Bryn Mawr), '98; Colorado College, '02.

EDWARD S. PARSONS, A. M., B. D., LITT. D. 1328 N. Nevada.
Vice-President, Dean and Bemis Head Professor of English.
A. B. (Amherst), '83; A. M. (*ibid.*), '86; B. D. (Yale), '87; Litt. D. (Amherst), '03; Colorado College, '92.

SIDNEY F. PATTISON, A. B. Y. M. C. A.
Assistant Professor of English.
A. B. (Rochester), '98; A. B. (Williams), '99; Colorado College, '99.

HENRY ALFORD RUGER, A. B. Hagerman Hall.
Assistant Professor of Philosophy and Education.
A. B. (Beloit), '95; Graduate Student: University of Chicago, '00-'01; University of Wisconsin, '01-'03; Columbia, '03-'04. Colorado College, '04.

EDWARD C. SCHNEIDER, PH. D. Montgomery Hall.
Professor of Biology.
B. S. (Tabor), '97; PH. D. (Yale), '01; Colorado College, '03.

JOHN CUTLER SHEDD, PH. D. 1103 Wood Ave
Professor of Physics.
A. B. (Princeton), '91; M. S. (Cornell), '92; PH. D. (Wisconsin), '99; Colorado College, '00.

*HUGH ALLISON SMITH, A. M.
Professor of French Language and Literature.
A. B. (Missouri), '97; A. M. (*ibid.*), '98; Colorado College, '99.

WILLIAM STRIEBY, A. M., E. M. 805 N. Cascade Ave.
Professor of Chemistry and Metallurgy.
A. B. (University of New York), '75; E. M. (Columbia School of Mines), '78; A. M. (University of New York), '79; Colorado College, '80.

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*On Leave of Absence, '04-'05.

WILLIAM C. STURGIS, PH. D. Las Pampas.

Lecturer on Botany.

A. B. (Harvard), '84; A. M. (*ibid.*), '87; PH. D. (*Ibid*), '89; Colorado College, '03.

THOMAS K. URDAHL, PH. D. 1107 Wood Ave.

Professor of Political and Social Science.

B. L. (Wisconsin), '91; M. L. (*ibid.*), '92; PH. D. (*ibid.*), '97; Colorado College, '00.

O. B. WILLCOX, LL. B. 1515 Wood Ave.

Lecturer on Law.

LL. B. (Michigan), '89; Colorado College, '04.

CAROLYN S. WURSTER. McGregor Hall.

Instructor in Chemistry.

A. B. (Smith), '00; Colorado College, '04.

DELL HEIZER, A. B. 1432 Wood Ave.

Director of the Department of Art.

A. B. (Colorado College), '99; Department of Art, Colorado College, '00-'03; Pupil of Kenyon Cox and of William M. Chase, '03-'04; Colorado College, '04.

CLARENCE WILBER BOWERS. 1005 N. Wahsatch Ave.

Instructor in Piano-forte, Organ, Harmony and Counterpoint.

Graduate, New England Conservatory of Music, Boston; Pupil of G. W. Chadwick and Ferruccio Busoni, '90-'92; Pupil of Alexandre Guilmant, Paris, '95-'96; Colorado College, '96.

MRS. ROBERT BRISCOE. 801 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95: Colorado College, '00.

MRS. FREDERICK A. FAUST. 114 E. Monument St.

Instructor in Piano-forte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

SAMUEL JESSOP. 208 E. Dale St.

Instructor in Voice Culture.

Honor Certificate, Royal Academy of Music, '84; Organist and Choirmaster, Dartford Parish Church, London, '91-'01; Colorado College, '02.

Committees of the Faculty

Accredited Schools: Professors Ruger, Gile, Strieby.

Art: Miss Heizer, Miss Hubbard, Mr. Moore.

Athletics: Professors Ruger, Noyes, Crabtree.

Courses of Study of Individual Students: Professors Parsons, Noyes, Finlay, Miss Loomis.

Discipline: The President, Professors Parsons, Cajori, Gile, Schneider.

Engineering: Professors Cajori, Crabtree, Lyon.

Extension Lectures: Professors Ahlers, Noyes, Urdahl.

Fraternities: Professors Cajori, Gile, Hills, Miss Loomis.

Music: Professor Parsons, Mr. Jessop, Mrs. Faust.

Post-Graduate Degrees: Professors Hills, Ahlers, Urdahl, Miss Park.

Publications: Professors Brehaut, Pattison, Urdahl.

Publicity: Professors Hills, Ahlers, Lyon.

Schedule: Professors Shedd, Loud, Noyes, Pattison, Lyon.

Scholarships: The President, Professors Parsons, Gile, Cajori, Miss Park.

Students' Self-Help: Professors Ruger, Mr. Collais, Mr. Moore.

Class Officers: *Seniors,* The President; *Juniors,* Professor Ruger; *Sophomores,* Professor Schneider; *Freshmen,* Professor Hills; *Special Students,* Professor Noyes.

Admission

REGISTRATION.

Before registering, each candidate must present to the Dean a certificate of moral character signed by some responsible person in the community in which he has made his home. Students are required to register promptly and attend the first exercises in their courses.

ENTRANCE REQUIREMENTS.

1 ENGLISH, 3 units.*

2 HISTORY, 1 unit.

3. MATHEMATICS, 2 units (preferably 3).

4. LATIN, GERMAN, OR FRENCH, 4 units, of which 2 must be Latin.

5. SCIENCE, 2 units (to be selected from the list of sciences given below in 6; but the student is advised to offer Chemistry and Physics. If the student offers Greek, only one unit of Science is required).

6. ELECTIVES, sufficient to make a total of 16 units.

Greek, 1, 2 or 3 units.
German, 1 or 2 units.
French, 1 or 2 units.
Spanish, 1 or 2 units.
Mathematics, 1 unit.
History, 1 unit.
Chemistry, 1 unit.
Physics, 1 unit.
Physiology, ½ unit.
Zoology, ½ unit.
Botany, ½ unit.
Physiography, ½ unit.
Geology, ½ unit.
Mechanical Drawing, 1 unit.

*A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 45 minutes each a week.

UNIT COURSES IN PARTICULAR SUBJECTS.

1. ENGLISH—(3 units).

(*a.*) A practical knowledge of grammar and the elements of rhetoric.

(*b.*) A thorough study of the subject matter and style of the following works:

For 1905: Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Milton and Addison.

For 1906, 1907, and 1908: Shakespeare's Julius Cæsar; Milton's Lycidas, Comus, L'Allegro and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

(*c.*) A careful but not minute study of the following works, sufficient to give the candidate a clear idea of their important parts:

For 1905: Shakespeare's The Merchant of Venice and Julius Cæsar; The Sir Roger de Coverley Papers in the Spectator; Goldsmith's The Vicar of Wakefield; Coleridge's The Ancient Mariner; Scott's Ivanhoe; Carlyle's Essay on Burns; Tennyson's The Princess; Lowell's The Vision of Sir Launfal; George Eliot's Silas Marner.

For 1906, 1907, and 1908: Shakespeare's The Merchant of Venice and Macbeth; The Sir Roger de Coverley Papers in The Spectator; Irving's Life of Goldsmith; Coleridge's The Ancient Mariner; Scott's Ivanhoe and The Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Lowell's The Vision of Sir Launfal; George Eliot's Silas Marner.

2. HISTORY—(1 unit). An outline knowledge of the leading facts of either Ancient, Greek and Roman, Mediæval and Modern, American, or English history.

(*a.*) Ancient History: Myers and Botsford, Myers, West, or an equivalent.

(*b*) Greek and Roman: Botsford, Allen, or an equivalent.

(*c.*) Mediæval and Modern: Myers, or an equivalent.

(*d.*) American: Channing, McLaughlin, Thomas, Johnston, Montgomery, or an equivalent.

(*e.*) English: Larned, Coman and Kendall, Montgomery, or an equivalent.

3. Mathematics—(2 units; preferably 3).

(*a.*) Algebra, through simultaneous quadratic equations (1 unit).

(*b.*) Elementary Plane Geometry: the first five books of Phillips and Fisher's, Wells', or Wentworth's Geometry, or an equivalent (1 unit).

(*c.*) Solid and Spherical Geometry (½ unit).

(*d.*) Plane Trigonometry (½ unit).

It is recommended that Algebra and Plane Geometry be reviewed in the last year of the preparatory course.

4. Latin—(*a.*) An accurate and ready knowledge of grammatical forms. Cæsar's Gallic War, Bks. I-IV, or an equivalent. Prose Composition based on Cæsar. Careful attention should be given from the beginning to correct pronunciation of the Latin and to the use of idiomatic English in translation. (2 units).

(*b.*) Cicero: seven orations. The following are recommended: The four orations against Catiline, Archias, the Manilian Law, Marcellus. Translation at sight of easy passages of prose. Prose Composition. (1 unit).

(*c.*) Vergil: Aeneid, Bks. I-VI. Prose Composition based on Cicero. (1 unit).

5. Greek—(*a.*) White's First Greek Book, or an equivalent. Xenophon's Anabasis (20 or 30 pages). Practice in sight translation. The rules of accentuation. (1 unit).

(*b.*) Four books of the Anabasis. Reading at sight. Prose Composition based on the Anabasis. Careful grammatical study. (1 unit).

(*c.*) Three books of the Iliad with prosody and dialectic forms. Sight translation. Prose Composition. (1 unit).

6. German, French and Spanish—(*a.*) The work of the first year should comprise: (1) Drill in the rudiments of grammar;

(2) careful drill in pronunciation; (3) the memorizing and frequent repetition of easy colloquial sentences; (4) abundant easy exercises; (5) the reading in graduated texts of from 75 to 100 pages of German, or from 100 to 175 pages of French or Spanish prose.

(*b.*) The work of the second year should comprise: (1) The careful reading of from 150 to 200 pages of German literature, or from 250 to 400 pages of French or Spanish literature, in the form of easy stories or historical or biographical sketches; (2) accompanying practice, as before, in the translating from English of easy variations from the matter read, and also in off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill in the rudiments of grammar.

A good selection of texts for the second year, arranged in suitable order for reading, would be:

German: Andersen, *Maerchen* or *Bilderbuch;* Leander, *Traeumereien*; Hauff, *Das kalte Herz;* Zschokke, *Der zerbrochene Krug;* Hillern, *Hocher als die Kirche;* Storm, *Immensée;* Baumbach, *Die Nonna, Der Schwiegersohn;* Heyse, *L'Arrabiata, Das Maedchen von Trepps, Anfang und Ende;* Jensen, *Die Braune Erica;* Sidel, *Maerchen.*

French: (1) Mairet, *la Tâche du petit Pierre,* Malot, *Sans famille,* or Bruno, *le Tour de la France;* (2) Labiche and Martin, *le Voyage de M. Perrichon;* Halévy, *l'Abbé Constantin,* or Merimée, *Colomba;* (3) Dumas, *la Tulipe noire,* or Erckmann-Chatrian, *Madame Thérèse;* (4) Sarcey, *le Siège de Paris,* or Lamartine, *Jeanne d'Arc;* (5) Daudet, *Contes,* or George Sand, *la Mare au diable.*

Spanish: (1) Valera, *El pájaro verde* and Alarcón, *El capitán Veneno,* or about 100 pages of Padre Isla's version of *Gil Blas;* (2) Perez Galdós, *Doña Perfecta* or *Marianela;* (3) Echegaray, *Ó locura ó santidad,* Ramos y Vidal, *Zaragueta,* or Moratín, *El sé de las niñas.*

A third and a fourth year of German or French will be accepted as an elective entrance subject if the work has

been done satisfactorily. Candidates for admission to Colorado College are advised to present two units of German, French, or Spanish, as preparatory to admission to the German B., French B., or Spanish B., given in the College.

7 Physics—(1 unit). Not less than two hours a week of recitation, and four of laboratory work; Carhart and Chute's Elements of Physics, Wentworth and Hill's Text-Book of Physics, or an equivalent.

8. Chemistry—(1 unit). Williams' Elements of Chemistry, or an equivalent.

9. Physiology—(½ unit). Textbook work should cover such a text as Blaisdell's "Practical Physiology." In addition, the course should include a rough dissection by the teacher of the frog and cat, and a microscopic examination of the more important tissues.

10. Zoology—(½ unit). Textbook work equal in amount to that contained in Kellogg, Jordan or Davenport; laboratory work on the structure of at least ten forms and a comparison with other types. The drawings and descriptions in the candidate's laboratory note-book must be certified by the teacher.

11. Botany—(½ unit). The requirements include a knowledge of the structure and more important physiological processes of flowering plants, also of the modifications of parts for special functions, of the plant societies, pollenation and dissemination. It is also desirable that the candidate have the ability to identify ordinary seed plants. A laboratory notebook certified by the teacher must be presented by the candidate. Such texts as Bergen's "Foundation of Botany" and Coulter's "Plant Studies" are recommended.

12. Physiography—(½unit). Tarr, Davis, Dryer, or an equivalent.

13. Geology—(½unit). Scott's Introduction to Geology, or an equivalent, with practice in the determination of the commoner rocks, igneous, sedimentary and metamorphic.

14. Mechanical Drawing—(1 unit).

ADMISSION BY CERTIFICATE.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to the above requirements, will be admitted without condition into the Freshman Class. Each candidate must bring from the principal of the school last attended a personal statement as to his grade of scholarship.

Accredited Schools.

The following schools are on the accredited list. Certificates of the satisfactory completion, in any of them, of any branch in the course of study required for admission to the College, will be accepted in place of an examination.

Aspen High School.
Canon City High School.
Canon City So. Side High School.
Central City High School.
Cheyenne (Wyo.) High School.
Colorado Springs High School.
Cripple Creek High School.
Delta High School.
Denver: High School, Dist, No. 1.
" High School, Dist. No. 2.
" High School, Dist. No. 7.
" High School, Dist. No. 17
" Manual Training High School.
Douglas Co. H. S., Castle Rock.
Durango High School.
Florence High Shcool.
Fort Collins High School.
Fort Morgan High School.
Fruita High School.
Georgetown High School.
Golden High School.
Wolfe Hall, Denver.
Gordon Academy, Salt Lake City.
Grand Junction High School.
Greeley High School.
Idaho Springs High School.
Leadville High School.
Longmont High School.
Loveland High School.
Manitou High School.
Monte Vista High School.
Otero Co. High School, La Junta.
Ouray High School.
Pueblo High School, Dist. No. 1.
" High School, Dist. No. 20.
Salida High School.
Telluride High School.
Trinidad High School.
Victor High School.
Walsenberg High School.
Wheat Ridge High School, Alcott.
Miss Wolcott's School, Denver.

Certificates from schools not on the accredited list will be considered as the merits of each case may warrant.

ADMISSION BY EXAMINATION.

Candidates for admission, unless admitted by certificate, must pass examinations in the requirements indicated above. Such examinations will be held in Palmer Hall on Wednesday, May 31, and Thursday, June 1, 1905, and again on Tuesday, September 12, 1905.

ADMISSION TO ADVANCED STANDING.

Students will be received into advanced classes on examination in the studies previously pursued. The Faculty may, at their discretion, receive certificates from other colleges as evidence that the student has satisfactorily pursued those or equivalent studies.

SPECIAL STUDENTS.

Special students will be received, at the discretion of the Faculty, into such classes as they are qualified to enter. It is the rule of the College that such students must attend the examinations as well as the ordinary recitations of their classes, subject to the same conditions as other students.

Several of the courses of lectures which form part of the College instruction, particularly in the department of Philosophy, are open to the public on payment of a small fee, and without any requirement of examination.

Course of Study

In the College, beginning with 1906, only one degree will be given, that of Bachelor of Arts. To secure this degree the student will be required to complete a course of study consisting of (1) certain prescribed studies, (2) a specified number of hours in a major subject, (3) enough free electives to bring his work up to the total requirement of 60 hours, making an average of 15 hours a week throughout the four years.

PRESCRIBED STUDIES.*

FRESHMAN YEAR.....Mathematics A (1), A (2), A (3), 4 hours.
English B, 3 hours.
And one of the following groups:

1. Greek, Latin, and German or French.
2. Greek, German or French, and Science.
3. Latin, German or French, and Science.
4. German, French, and Science.

Each subject in the above four groups comes three times a week. The course in Science must be Chemistry, Physics, or Biology. If the student does not elect Science in the Freshman year, he must take it in the Sophomore year.

SOPHOMORE YEAR.....English C and D, 3 hours.
History, 2 hours.

JUNIOR YEAR.....Philosophy A and B, 3 hours.
Economics A, first half-year, 2 hours.

SENIOR YEAR.....Philosophy C and D, 4 hours.

MAJOR SUBJECT.

In addition to the above prescribed subjects, each student shall select a major subject, or specialty, if possible before the end of the Sophomore year, and, in any case, not later than the beginning of

*Unless otherwise stated, each course continues through the year.

the Junior year. The professor in charge of the major subject will act as the student's adviser, and will have authority, with the Dean, to require the completion of work amounting to fifteen (15) hours in the major subject, or in the major subject and in such minor subjects as he shall consider necessary, or collateral, work. Mention of the major subject will be made in the diploma.

Any one of the following may be selected by the student as his major subject: (1) Philosophy; (2) Greek; (3) Latin; (4) English; (5) German; (6) French; (7) Spanish and Italian; (8) Economics and Political Science; (9) History; (10) Mathematics; (11) Astronomy; (12) Physics; (13) Chemistry; (14) Biology; (15) Geology.

English B and C, and Mathematics A cannot be counted as part of the requisite fifteen (15) hours.

Petitions to change the major subject will be granted only when approved by the professors in charge of both the old and the new subjects, and when granted, the student will be held to all the requirements of the new major subject. In no case can the major subject be changed later than the beginning of the Senior year.

ELECTIVES.

The student shall elect from the list given below, in addition to the prescribed subjects and the major subject, a sufficient number of courses to bring the total amount of his College work up to sixty (60) hours. Of the following list of electives, not all will be given in any one year. Each continues through the year, unless it is otherwise stated.

PHILOSOPHY.—(p. 33)

		Hours per week.
E.	*Modern German Philosophy;* first half-year	2
F.	*The Philosophical Movement in England;* second half-year	2
G.	*Advanced Logic;* second half-year	2
H.	*Lotze;* second half-year	2
I.	*Seminary in Social Ethics;* second half-year	1
J.	*Seminary in Greek Philosophy;* one half-year	1
K.	*English Interpretations of Religion;* second half-year	2
L.	*Experimental Psychology;* second half-year	2
M.	*Advanced Psychology;* first half-year	

EDUCATION.—(p. 36) Hours per week.

A. *History and Philosophy of Education;* second half-year.. 3
B. *Genetic Psychology;* first half-year..... 3
C. *Research Work in Psychology and Education.*
D. *Play in Animals and Men and its Bearing on Education;* first half-year 1

GREEK.—(p. 36)

A. *Selections from Homer, Plato and Herodotus*..... 3
B. *Drama* 3
C. *History;* one half-year..... 3
D. *Philosophy; one half-year*..... 3
E. *Epic and Lyric Poetry;* one half-year..... 3
F. *Course for Teachers;* one half-year..... 3
I. *New Testament;* second half-year..... 3
H. *History;* second half-year 2

LATIN.—(p. 37)

A. *Course for Freshmen*..... 3
B. *Course for Sophomores*..... 3
C. *Drama;* one half-year..... 3
D. *Catullus and the Elegiac Poets;* one half-year..... 3
E. *Satire;* one half-year..... 3
G. *Vergil;* one half-year..... 3
H. *Course for Teachers;* one half-year..... 3
J. *Roman History;* second half-year..... 3

ENGLISH.—(p. 38)

E. *Early English Literature;* first half-year..... 3
F. *Middle English;* second half-year..... 3
G. *Chaucer and Spenser;* first half-year..... 3
H. *English Drama, through Marlowe;* first half-year..... 3
I. *Shakespeare;* second half-year..... 3
J. *Shakespeare* 2
K. *Milton;* first half-year..... 3
L. *English Poetry from Dryden to Burns;* first half-year... 3
M. *Keats, Shelley, Byron, Coleridge, Wordsworth;* second half-year..... 3
N. *Tennyson and Browning;* first half-year..... 3
O. (2) *Modern English Prose;* second half-year..... 3

Hours per week.

P. *Old English;* first half-year 3
Q. *Beowulf,* second half-year 3
R. *Lyrics;* second half-year 2
S. *Outline History of English Literature;* first half-year 3
T. *Advanced Composition;* second half-year 2
U. *English Novelists of the Nineteenth Century;* first half-year 3
V. *Greek Drama for English Readers;* second half-year 3

PUBLIC SPEAKING.—(p. 39)

A. *Declamation* 1
B. *Oratory* 2
C. *Argumentation;* one half-year 2
D. *Extempore Speaking* 1

GERMAN.—(p. 40)

A. *Elementary Course* 3
B. *Intermediate Course* 3
C. *Schiller and Goethe;* first half-year 2
D. *Lessing and Goethe;* second half-year 2
E. *History of German Literature* 1
F. *The Nibelungenlied* 2
G. *Middle High German;* one half-year 3
H. *Gothic* 2
I. *Faust* 2
K. *Poetry of Goethe and Schiller* 2
L. *Teachers' Review* 1

FRENCH.—(p. 41)

A. *Elementary Course* 3
B. *Intermediate Course* 3
C. *Classical French* 2
D. *Nineteenth Century Literature* 2
E. *Molière* 2
F. *A General View of French Literature to Corneille* 2
G. *A General View of French Literature from Corneille* 2
H. *Old French* 2
I. *French Phonetics and Colloquial French* 1

SPANISH.—(p. 43)

A. *Elementary Course* 3

Hours per week.

B. *Modern Spanish Literature* 2
C. *Literature of the Sixteenth and Seventeenth Centuries* ... 2

ITALIAN.—(p. 44)

A. *Elementary Course* 2
B. *Literature of the Thirteenth and Fourteenth Centuries* 2

ECONOMICS.—(p. 44)

B. *Charities and Corrections;* second half-year 3
C. *Money and Banking;* first half-year 3
E. *Colonial Policy;* second half-year 2
F. *Economic and Social History of the United States* 3
G. *Public Finance;* second half-year 3
H. *Seminary;* second half-year 3

POLITICAL SCIENCE.—(p. 46)

A. *Historical Politics;* first half-year 3
B. *Comparative Politics;* second half-year 3

HISTORY.—(p. 46)

B. *American* 3
C. *The Napoleonic Era and Modern Times;* second half-year 2
D. *Modern European History;* second half-year 2
E. *Mediaeval History;* first half-year 2
G. *Seminary in American History* 3

LAW.—(p. 48)

A. *Elementary Law*; first half-year 3
B. *American Constitutional Law;* second half-year 3
C. *Contracts* 2
D. *Torts* 2
E. *Domestic Relations and the Law of Persons* 2
F. *Property* 2

MATHEMATICS.—(p. 49)

B. (*1.*) *Analytical Geometry* (elementary); first half-year ... 3
B. (*2.*) *Analytical Geometry* (more advanced); second half-year 3
C. *Calculus, Differential and Integral;* { first half-year ..... 3; second half-year ... 4
D. *History and Logic of Mathematics;* one half-year 2

Hours per week

E. *Modern Methods in Geometry;* one half-year..... 3
F *Theory of Equations;* one half-year..... 3
H. *Determinants;* one half-year..... 2
I. *Elementary Surveying;* second half-year..... 3
J. *Theoretical Mechanics*..... 4

ASTRONOMY.—(p. 50)

A. *Elementary Astronomy;* second half-year..... 3
B. *Observations and Computations;* first half-year..... 3
C. *Celestial Mechanics*..... 2
D. *Elementary Meteorology;* second half-year..... 3
F. *Stellar Photography;* one half-year.....

PHYSICS.—(p. 51)

A. *General Physics*..... 3
B. *General Physics*..... 4
C. *Theoretical Physics*..... 3
D. *Practical Physics*..... 2
E. *Advanced Physics*..... 2
G. *Problem Work*..... 1 or 2
K. *Precise Measurements in Electricity and Magnetism*..... 2

CHEMISTRY.—(p. 53)

A. *Elementary Chemistry*..... 3
B. *Advanced Chemistry*..... 3
C. *Qualitative Analysis*..... 4
D. *Quantitative Analysis*..... 4
E. *Organic Chemistry*..... 3
F. *Theoretical Chemistry*..... 3
G. *Medical Chemistry*..... 3

BIOLOGY.—(p. 55)

A. *General Biology*..... 3
B. *Zoology*..... 3
C. *Physiology*..... 3
D. *Comparative Anatomy of Vertebrates;* first half-year... 3
E. *Mammalian Anatomy;* second half-year..... 3
F. *Histology;* first half-year..... 3
G. *Embryology and Cytology*..... 3
H. *Bacteriology*..... 2
I. *Sanitary Science and Public Health*..... 1

Hours per week.

J. *Plant Physiology;* first half-year..... 3
K. *Systematic Botany: Seed Plants;* second half-year.... 3

GEOLOGY.—(p. 57)

A. *General Geology*..... 3
B. *Mineralogy* 3
E. *Economic Geology*..... 3
F. *Invertebrate Paleontology;* second half-year..... 3
G. *Vertebrate Paleontology;* second half-year..... 3
H. *Petrography;* first half-year. 3
I. *Field Geology.*

BIBLE STUDY.—(p. 58)

Old Testament Literature..... 1

MUSIC.—(p. 59)

*Harmony** 2
*Counterpoint** 2
*Composition** 2

*For the courses in Music an additional tuition will be charged.

Departments of Instruction

PHILOSOPHY

President Slocum, Assistant Professor Ruger.

The required work in this department extends over the whole of the Junior and Senior years, and gives the student a knowledge of the development of thought in the several departments of philosophy. The various seminary courses afford training in the study and discussion of important psychological, sociological and ethical questions.

A. *Logic.*—Formal logic and the logic of science. Lectures, recitations, reports and criticisms of arguments and methods of research. Problems in epistemology and metaphysics will be raised throughout, and the course will thus serve as an introduction to philosophy. References: Welton's Manuals, Aikins, Creighton, Jevons' Principles of Science, Pearson's Grammar of Science, etc. One half-year, 3 hours.—Professor Ruger.

B. *Psychology.*—One half-year, 3 hours.—Professor Ruger.

1. *Neurology.* Anatomy and physiology of the nervous system. Stereopticon lectures presenting the gross and microscopic character of the nervous system. Charts, models and a collection of brains afford further illustrative material for comparative and human neurology. References: *Barker, Donaldson, Loeb, etc.*

2. *General Psychology.*—The general characters and problems of consciousness; the functional point of view in psychology. Especial attention will be given to the psychology of the thought processes. Lectures, demonstrations, experiments by the class, recitations and reports on special topics. Text, *Angell.* References: *James, Stout, Titchener, Jastrow, Baldwin, etc.*

L. *Experimental Psychology.*—A laboratory course. Sensation including psychophysics, perception, motor changes in cognitive

and affective processes, memory, association, fatigue, reaction; statistical methods. The problems of space perception will receive especial attention. References: *Titchener, Sanford, Woodworth, Stratton, Witmer, Bourdon;* for statistical methods, *Cattell and Thorndike.*—Second half-year, 2 hours.

M. *Advanced Psychology.*—Special topics such as belief, attention, consciousness of self, the emotions, body and mind. Discussions and reports. References: *James, Bain, Mill, Stout, Ward, Hobhouse, Strong.* First half-year.

C. *History of Philosophy.*—First half-year, 4 hours.—President Slocum.

1. *Lectures, Recitations and Conferences.*—3 hours.

(*a.*) Study in Comparative Religions.

(*b.*) Greek Philosophy. 20 lectures.

(*c.*) Modern Philosophy. 15 lectures. (1) The Rise and Fall of Scholasticism; (2) The Beginnings of Modern Philosophy—Bacon and Descartes; (3) Spinoza; (4) Locke; (5) The Skeptical Movement in France; (6) Leibnitz; (7) Berkeley; (8) Hume; (9) Kant, The Critique of Pure Reason; (11) Kant, The Transcendent Element in his Philosophy; (12) Hegel; (13) Schopenhauer; (14) Lotze; (15) Spencer—The Philosophy of Evolution.

2. *Metaphysical Seminary.*—1 hour.

Presentation of papers and discussion of the following subjects:

(*a.*) The Great Religions of the World.

(*b.*) The Psychological Basis of Religious Faith.

(*c.*) Psychological Basis of Æsthetics.

(*d.*) Philosophical Thought in England during the Nineteenth Century.

(*e.*) Evolution: Its History, Development and Results.

D. *Ethics.*—Second half-year, 4 hours.—President Slocum.

1. *Janet's Theory of Morals.*—Lectures, theses and discussions. 3 hours.

(*a.*) The Fundamental Principles of Ethics, 12 lectures.

(*b.*) Christian Ethics. 3 lectures.

2. *Ethical Seminary.*—1 hour.

Presentation of papers and discussions upon the following subjects:

(*a.*) Modern Social and Sociological Problems

(*b.*) The Ethical View of Citizenship.

(*c.*) A study of Educational Theories from an Ethical Standpoint.

E. *Modern German Philosophy.*—First half of Senior year, 2 hours. —President Slocum.

F. *The Philosophical Movement in England.*—Second half of Senior year, 2 hours.—President Slocum.

G. *Advanced Logic.*—Second half-year, 2 hours.—President Slocum.

H. *Lotze.*—Second half-year, 2 hours.—President Slocum.

I. *Seminary in Social Ethics.*—The Labor Question, Temperance, Pauperism and other social problems considered from an ethical standpoint. Second half-year, 1 hour.

J *Seminary in Greek Philosophy.*—One half-year, 1 hour.

K. *English Interpretations of Religion.*—Second half-year, 2 hours. —Mr. Hastings.

(1) Age of the Renaissance; (2) Reformation Movement; (3) Puritanism; (4) Eighteenth Century Conceptions of Religion; (5) Coleridge and Wordsworth; (6) Carlyle and his Philosophy of Life; (7) Newman and the Church Revival; (8) Growth of Scientific Conceptions; (9) Rise of the Critical Mind; (10) Matthew Arnold and his Ethical Idealism; (11) Idealism of the Poets; (12) Agnosticism; (13) Religious Import of Evolution; (14) Philosophical Idealism; (15) Martineau and Christian Theism; (16) Present Day Religious Thought.

EDUCATION

ASSISTANT PROFESSOR RUGER.

A. *History and Philosophy of Education.*—A study of educational reformers, theories, institutions, ancient and modern; recent developments in education. Lectures, discussions and reports. Second half-year, 3 hours.

B. *Genetic Psychology.*—A study of animal and child psychology with special references to educational application. Reflex action, instinct, learning by experience, imitation, conceptual thought, language; stages of development in the child; methods of child study. The course will include experimentation on animal methods of learning, observation of children and the working up of special topics. References: *Thorndike, Hobhouse, Judd, O'Shea, Hall, King, Kirkpatrick, Munroe, Barnes,* etc. First half-year, 3 hours.

C. *Research Work in Psychology and Education.*—Hours to be arranged.

D. *A Study of Play in Animals and Man and its Bearing on Education.*—First half-year, 1 hour.

NOTE.—For courses intended especially for teachers see Greek F, Latin H, German L, French F and G, Mathematics D, Physics B.

GREEK*

PROFESSOR GILE, ASSISTANT PROFESSOR BREHAUT AND MISS PARK.

A. Homer, selections from the *Odyssey* and *Iliad* in the original and all the poems in translation; Plato, *Apology* and *Crito;* Herodotus, selections.—3 hours.

B. *Greek Drama.*—Æschylus, *The Septem* and *Prometheus;* Sophocles, *Antigone;* the remainder of Æschylus' and Sophocles' plays in translation; Euripides, *Alcestis* and *Medea.*—3 hours.

C. *Greek History.*—(*a.*) Herodotus; careful study of the period of the Persian Wars. Reading from the dramatists for further illustration of the life of the period; or, (*b.*) Thucydides, the

*Students who enter without Greek are permitted to take as College work, courses in Greek in Cutler Academy.

Sicilian Expedition. Parallel readings in Curtius, Grote and other modern historians. Selections from Plutarch's Lives. One half-year, 3 hours.

D. *Greek Philosophy.*—Plato, *Phaedo.* Selections from other dialogues, and from the works of Xenophon. Zeller's *Socrates and the Socratic Schools.* One half-year, 3 hours.

E. *Greek Epic and Lyric Poetry.*—Homer, Hesiod and Pindar. One half-year, 3 hours.

F. *A Course Designed for Teachers.*—Selections from Xenophon; composition; careful grammatical study. One half-year, 3 hours.

I. *New Testament Greek.*—Open to students who have had one year of Greek. Second half-year, 3 hours.

H. *Greek History.*—An outline from the earliest times down to 146 B. C. A knowledge of Greek is not required. Second half-year, 2 hours.

NOTE.—For a course in Greek Drama for English readers, see English V.

LATIN

PROFESSOR GILE, ASSISTANT PROFESSOR BREHAUT AND MISS PARK.

A. Livy, Selections from Books XXI and XXII; Cicero, *De Senectute, De Amicitia;* Horace, *Odes.*—3 hours.

B. Horace, Selections from the *Epistles* and *Satires;* Tacitus, *Germania* and *Agricola;* Terence, *Phormio;* Plautus, *Captivi;* Cicero, *Selected Letters.*—3 hours.

C. *Drama.*—Selected plays of Plautus and Terence; history and characteristics of the Roman Drama. One half-year, 3 hours.

D. *Catullus and the Elegiac Poets.*—One half-year, 3 hours.

E. *Satire.*—History and characteristics of Roman Satire. Selections from Horace, Persius, Juvenal. Parallel readings in English Literature. One half-year, 3 hours.

G. *Vergil.—The Aeneid,* Books VII-XII; the *Bucolics,* and Selections from the *Georgics.* One half-year, 3 hours.

H. *A Course Designed for Teachers.*—Selections from Cæsar and Cicero; composition; careful grammatical study. One half-year, 3 hours.

J *Roman History.*—An outline from the earliest times to the fall of the Roman Empire. A knowledge of Latin is not required. Second half-year, 3 hours.

ENGLISH

PROFESSOR PARSONS, ASSISTANT PROFESSORS NOYES AND PATTISON.

B. *Rhetoric and Composition.*—Elementary course. 3 hours.

C. *Forms of Composition.*—Prerequisite, Course B. First half-year, 3 hours.

T. *Advanced Composition.*—Prerequisite, Course C. Second half-year, 2 hours.

D. *American Literature.*—Irving, Cooper, Poe, Bryant, Hawthorne, Longfellow, Emerson, Lowell, Holmes, Whittier. Second half-year, 3 hours.

S. *Outline History of English Literature.*—First half-year, 3 hours.

E. *Early English Literature.*—A rapid survey, from the Anglo-Saxon Conquest to Chaucer. First half-year, 3 hours.

F. *Middle English.*—A study of the development of the English language and literature in the twelfth and thirteenth centuries. Second half-year, 3 hours.

G. *Chaucer and Spenser.*—The principal poems read critically in class. Life and thought of the times. First half-year, 3 hours.

H. *The English Drama: Through Marlowe.*—Principles and development. First half-year, 3 hours.

I. *The English Drama: Shakespeare.*—The principal plays read chronologically. Second half-year, 3 hours.

J. *Shakespeare.*—A critical text study of three dramas of Shakespeare. The class meets once a week for a two-period session. —PROFESSOR AHLERS.

K. *Milton.*—A comprehensive study of the poet's personality and work. Given in alternate years: 1904-05; 1906-07. First half-year, 3 hours.

L. *English Poetry from Dryden to Burns.*—First half-year, 3 hours.

M. *Keats, Shelley, Byron, Coleridge, Wordsworth.*—Second half-year, 3 hours.

N. *Tennyson and Browning.*—First half-year, 3 hours.

O. *Modern English Prose.* (1) Dryden to DeQuincy. Second half-year, 3 hours. Alternate with (2). Omitted in 1905-06. (2) Carlyle, Arnold, Ruskin. Second half-year, 3 hours.

P. *Old English.*—The beginnings of English Literature. Reading is begun at once and the study is made as literary in character as possible. First half-year, 3 hours.

Q. *Old English.*—Beowulf. Prerequisite, Course P. Second half-year, 3 hours.

R. *Lyrics.*—Second half-year, 2 hours.

U. *English Novelists of the Nineteenth Century.*—Jane Austen, Scott, Dickens, Thackeray, George Eliot, Stevenson. First half-year, 3 hours.

V. *Greek Drama for English Readers.*—Literary study of Aeschylus and Sophocles in poetic translation; lectures on the Greek Theatre and on Greek Art. Second half-year, 3 hours.

PUBLIC SPEAKING*

MR. DEWITT.

A. *Declamation.*—One declamation to be prepared and delivered every four weeks. Training in class in reading with expression. Southwick's *Steps to Oratory.* 1 hour.

B. *Oratory.*—An analytical study of the speeches of noted orators. An understanding of the facts bearing upon the man, the subject and the occasion. Lectures on the divisions of the oration. Drill in reading the speeches studied. The preparation and delivery of an oration each half-year. 2 hours.

C. *Argumentation.*—Analysis, brief drawing, persuasion, the preparation of arguments, brief debates, practical suggestions on delivery. One-half year, 2 hours.

*See Oratorical and Debating Contests, p. 102.

D. *Extempore Speaking.*—A brief speech is required each week with a view to general efficiency in public speaking. Criticism and suggestion on thought, expression and delivery. 1 hour.

GERMAN LANGUAGE AND LITERATURE*

PROFESSOR AHLERS.

A. *Elementary Course.*—Joynes-Meissner's *Grammar.* Andersen, *Maerchen;* Storm, *Immensee;* Hauff, *Das kalte Herz, Die Karavane;* Eichendorff, *Aus dem Leben eines Taugenichts.* 3 hours.

B. *Intermediate Course.*—Riehl, *Fluch der Schoenheit;* Jensen, *Die Braune Erica;* Chamisso, *Peter Schlemihl;* Heine, *Harzreise;* Gerstaecker, *Germelshausen;* Lessing, *Minna von Barnhelm;* Schiller, *Wilhelm Tell, Lyrics* and *Ballads.* Dictation. *Prose Composition and Syntax.* 3 hours.

C. Schiller, *Maria Stuart, Die Jungfrau von Orleans;* Goethe, *Egmont;* Sime's *Life of Goethe.* Dictation. First half-year. 2 hours.

D. Lessing, *Emilia Galotti, Nathan der Weise,* Rollestone's *Life of Lessing;* Goethe, *Iphigenie.* Dictation. Second half-year. 2 hours.

E. *Outline History of German Literature.*—This course is conducted in English, and is open to all College students, whether they are taking German or not. Kuno Francke's *History of German Literature* will be used as text-book. This reading will be supplemented by twelve lectures. 1 hour.

F. The *Niebelungenlied* and the Classic Period of the Twelfth Century. *Hartmann von Aue, Wolfram von Eschenbach, Gottfried von Strassburg.* Lectures and collateral reading. 2 hours.

G. *Middle High German.* — Braune-Paul's *Mittelhochdeutsche Grammatik; Nibelungenlied; Kudrun; Walter von der Vogelweide.* One half-year, 3 hours.

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*Authors and books designated under German A, B, C, and D indicate the scope rather than the actual works read in these courses.

H. *Gothic.*—Braune's *Gotische Grammatik;* Heyne's *Ulfilas.* 2 hours.

I. *The Faust Legend and Its Development, and Goethe's Faust.*—Synopsis of the Course:

CHAPTER I. Kindred Legends before the 16th Century.
(*a.*) Simon Magus. (*b.*) Ahasuerus. (*c.*) Anthemios, Proterius and Theophilus. (*d.*) Cyprianus Antiochus. (*e.*) Tannhæuser and Don Juan.

CHAPTER II. The historic Faust; the "Faustbuch" of 1587 and its development; the "Puppenspiele."

CHAPTER III. Faust Dramas before the 18th Century.
(*a.*) Calderon's El Magico Prodigioso.
(*b.*) Marlowe's Tragical History of Dr. Faustus.

CHAPTER IV. Faust in the 18th Century.
Lessing's Fragment: Maler Mueller, Klinger, etc.

CHAPTER V. Goethe's Faust.
(*a.*) The "Urfaust."
(*b.*) Faust, Part I. 1808.
(*c.*) Faust, Part II.

This course is conducted entirely in German. The class meets once a week for a 2-hour period.

K. *The Poems of Goethe and Schiller.*—This course is conducted entirely in German. The class meets once a week for 2 hours.

L. *A Review for Teachers.*—1 hour.

FRENCH LANGUAGE AND LITERATURE

PROFESSOR HILLS AND PROFESSOR SMITH.

A. *Elementary Course.*—Fraser and Squair's *French Grammar;* Aldrich and Foster's *French Reader;* Merimée, *Colomba;* Labiche et Martin, *le Voyage de M. Perrichon;* Dumas, *la Tulipe noire.* Writing from dictation, and practice in conversation. 3 hours.

B. 1. *Syntax and Prose Composition.*—Fraser and Squair's *French Grammar,* and composition. 1 hour.

2. *Modern Prose:* Daudet, *la Belle Nivernaise;* Musset, *Pierre et Camille;* Sand, *la Mare au diable;* Balzac, *le Curé de Tours;* Augier and Sandeau, *le Gendre de M. Poirier;* Lamartine, *Scènes de la révolution française* (Super); Vigny, *la Canne de Jonc.* 2 hours.

For outside reading: About, *le Roi des montagnes;* Balzac, *Eugénie Grandet;* Coppée, *Pour la couronne;* Dumas père, *les Trois mousquetaires;* Erckmann-Chatrian, *le Conscrit de 1813;* Feuillet, *le Roman d'un jeune homme pauvre;* France, *le Crime de Sylvestre Bonnard;* Lamartine, *Graziella;* Loti, *le Pêcheur d' Islande;* Malot, *Sans famille;* Souvestre *Un Philosophe sous les toits;* Vigny, *Cinq-mars;* Zola, *la Débacle.* Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works of fiction, if approved by the instructor, may be read in the place of those given in this list.

C. *Classical French.*—A study of the principal authors of the classical period. In 1905-1906 the following texts will be read: Corneille, *le Cid, Horace;* Racine, *Athalie, Andromaque;* Molière, *le Bourgeois gentilhomme, les Précieuses ridicules, l'Avare;* Voltaire, *Zaïre;* La Fontaine, *Fables;* Boileau, *l'Art poétique.* Lectures. Written reports. The outside reading will consist of parts of histories of French literature and of the writings of French literary critics. 2 hours.

D. *French Literature of the Nineteenth Century.*—Lectures, with reading of the principal authors, and reports by the members of the class. 2 hours. Not given in 1905-1906. To be given in alternate years.

I. *French Phonetics, and Colloquial French.*—Matzke's *Primer of French Pronunciation* (revised edition) and Kron's *French Daily Life* (Rippmann). 1 hour.

Students that take Course C or Course D are advised to take Course I also.

E. *Comedies of Molière.*—The more important comedies of Molière will be read by the instructor. Lectures on Molière and his time. Students desiring this course must consult the instructor. 2 hours. PROFESSOR AHLERS.

F. *A General View of French Literature from its Origins to Corneille.*—Lectures, reading, themes, and collateral reading. 2 hours.

G. *A General View of French Literature from Corneille to the Present Time.*—Lectures, reading, themes, and collateral reading. 2 hours.

Courses F and G will not be given the same year.

H. *Old French.*—Old French grammar, with reading from Old French texts. 2 hours.

Prerequisites, French A, B, C, D, and I, and Latin A.

SPANISH LANGUAGE AND LITERATURE

PROFESSOR HILLS.

A. *Elementary Course.*—Hills and Ford's *Spanish Grammar;* Ramsay's *Spanish Reader;* Valera, *El pájaro verde;* Echegaray, *Ó locura ó santidad;* Pérez Galdós, *Doña Perfecta.* Writing from dictation, and practice in conversation. 3 hours. Students are advised not to elect Spanish A and Italian A in the same year.

B. *Modern Literature of Spain and Spanish-America.*—First half-year: Selections from the prose writers of the Nineteenth Century. Second half-year: Ford's *Spanish Anthology;* Hills' *Bardos Cubanos.* 2 hours.

For outside reading: Alarcón, *El escándalo, El final de Norma, El niño de la bola, El sombrero de tres picos;* "Caballero", *La familia de Alvareda;* Isaacs, *María;* Palacio Valdés, *La aldea perdida;* Pardo Bazán, *De mi tierra, Los pazos de Ulloa;* Pereda, *Don Gonzalo Gonzáles;* Pérez Galdós, *Gloria* (2 vols.), *Marianela, Electra;* Valera, *Doña Luz, Pepita Jiménez.* Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works of fiction, if approved by the instructor, may be read in the place of those given in this list.

C. *Spanish Literature of the Sixteenth and Seventeenth Centuries,* with an especial study of Cervantes, Lope de Vega, and Calderón. Lectures and collateral reading. Prerequisite, Course

A, or equivalent. 2 hours. Not given in 1905-1906. To be given in alternate years.

NOTE.—In Courses B and C there are bi-weekly exercises in prose composition.

ITALIAN LANGUAGE AND LITERATURE

PROFESSOR HILLS AND PROFESSOR SMITH.

A. *Elementary Course.*—Grandgent's *Italian Grammar;* Bowen's *Italian Reader;* Goldoni, *Il vero amico;* Manzoni, *I promessi sposi.* 2 hours.

B. *Italian Literature of the Thirteenth and Fourteenth Centuries,* with an especial study of Petrarca and Dante. Lectures and collateral reading. 2 hours. Courses A and B are not given in the same year.

ECONOMICS

PROFESSOR URDAHL.

A systematic course in the elements of Political Economy, required of all students, is followed by elective courses in special subjects. Course A is a prerequisite to any of the electives except F.

A. *Elementary Economics.*—A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, followed by lectures and assigned reading on the general principles of consumption, production, exchange and distribution. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law or journalism, the general rules and principles contributed to business by the science of economics. Second half-year, 2 hours.

B. *Charities and Corrections.*—This course embraces first, a series of lectures on the theory and history of charity and reformatory work; second, a study of the dependent class, with special reading on the slum conditions in our large American cities; third, the delinquent class, the causes and prevention of crime, prison management and discipline. Charitable and

correctional institutions in the vicinity will be visited and special lectures will be given by men who have given special attention to some phase of these subjects. Second half-year, 3 hours.

C. *Money and Banking.*—The history and theory of money, credit and banking. The evolution of metallic currency. The position of the Bimetalists and the Quantity Theorists. Credit, credit instruments, paper money, convertible and inconvertible notes, modern currency problems and foreign banking systems are studied with special reference to American currency and banking. Lectures, recitations, reports and discussions. First half-year, 3 hours.

D. *Socialism.*—An historical and critical course in socialism and socialistic theory. Especial attention is paid to the historical basis of socialism, the French Revolution, the idealists, the German scientific socialists, the Christian socialists, the State socialism of today, and also to the various attempts at socialistic reforms. Lectures and recitations. First half-year, 3 hours. Not given in 1905-1906.

E. *Colonial Policy.*—The theories of colonization and the economic ideas and institutions underlying the modern expansionist movement; a brief history of the colonial experiments of the great colonizing nations of the world: Spain, Portugal, Holland, France, England, Russia and Germany; a brief account of commercialism past and present, and of modern trade theories. Lectures and recitations supplemented by outside reading. Second half-year, 2 hours.

F. *Economic and Social History of the United States.*—Alternate with History B. 3 hours.

G. *Public Finance.*—A survey of the whole field of public finance, including (*a.*) public revenues, their nature, classification and characteristics with special emphasis on taxation; (*b.*) public expenditures, their classification and relation to public welfare and to governmental functions; (*c.*) the budget and its preparation in the great countries of the world; (*d.*) public credit, its nature, employment, industrial effects and administration. Lectures, recitations and collateral reading in Adams', Seligman's and Ely's works. Second half-year, 3 hours.

H. *Seminary in Economics.*—Designed for graduates and undergraduates who have had sufficient preparation. After a brief survey of the theories of rents, wages and profits advanced by the classical economists, the more recent theories are studied with special reference to Marshall, Clark and Patten, McFarlane, Bohn-Bawerk, etc. Second half-year, 3 hours.

POLITICAL SCIENCE

PROFESSOR URDAHL.

A. *Historical Politics.*—The origin and growth of government from its primitive forms to the establishment of the modern states, the semi-amorphous horde, gentile society, the ancient city, The Athenian Democracy, the Greek Confederations, the Roman Republic and Empire, the Germanic folk, the feudal system, the political system of the Church, the Holy Roman Empire, the rise of national states, the development of absolute and constitutional monarchy, the growth of democracy, etc. Lectures supplemented by recitations and reports. Text: Wilson's *State.* First half-year, 3 hours.

B. *Comparative Politics.*—A study and comparison of the governments of the chief modern States; an exposition of the constitutional law of the United States and England and of their actual political organization. The great problems of federalism and centralization, presidential and responsible ministerial government, colonial government and civil liberty, receive especial consideration. Lectures, recitations and collateral reading. Second half-year, 3 hours.

HISTORY*

PROFESSOR URDAHL.

A. *English History.*—The political history of England from the earliest times to the American Revolution. Recitations and collateral reading, supplemented by lectures on the constitutional and economic development. Required of Sophomores. 2 hours.

*For courses in Greek and Roman History, see Greek H and Latin I.

B. *American History.*—A general survey, with emphasis on political and economic history. Course A is recommended as a preparation. In special cases the course may be elected for one half-year.

(*a.*) First half-year: To the close of the Revolution. 3 hours.

(*b.*) Second half-year: From the Revolution to the present time. 3 hours.

C. *The Napoleonic Era and Modern Times.*—The history of Western Europe in the nineteenth century. Second half-year, 2 hours.

D. *Modern History to the French Revolution.*—Alternate with Course C. Second half-year, 2 hours.

E. *Mediaeval History.*—A survey of the general history of Continental Europe through the period which lies between Ancient and Modern history. Not given in 1905-1906. First half-year, 2 hours.

G. *Seminary in American History.*—For 1905-1906 a study of the period of reform, 1830-1850, with special emphasis on the following topics: (*a.*) The reform movement in science, law, prison and charitable institutions, medicine, new constitutions, municipal government, civil service and religious movements; (*b.*) public lands and the relation of the states to public lands; (*c.*) banks, with special reference to Jackson's Bank War, state banks, the distribution of surplus revenues and the sub-treasury; (*d.*) the Annexation of Texas, the history of Old Mexico, the state of Texas, constitutional theories of annexation, consequences of annexation, the war with Mexico and the peace; (*e.*) slavery in the United States, the abolition movement, slavery and international law, slavery in the territories; (*f.*) the tariff and nullification. Open to graduates and undergraduates of sufficient preparation. The students are expected to exhaust the material within reach in the local libraries. 3 hours.

LAW

PROFESSOR URDAHL, MR. BABBITT, MR. HALL, MR. MCALLISTER, MR. WILLCOX.

The courses in Law are the equivalent of, and secure credit for, one year's work in the principal law schools of the country. The work has been arranged with a view to meeting the wants of students who, not intending to practice law, nevertheless desire a thorough foundation in the general principles on which Anglo-Saxon jurisprudence is based, as well as of those who intend to complete their studies and enter upon the practice of the profession.

A. *Elementary Law.*—A general view of the whole field of law and an introduction to its terminology and fundamental ideas. In addition to a careful study of a standard text-book the student is required to do collateral reading in Blackstone's and Kent's commentaries. First half-year, 3 hours.—PROFESSOR URDAHL.

B. *American Constitutional Law.*—The general principles of constitutional law of the United States, their interpretation and practical application; the origin and development of the written constitution in America. Recitations and lectures supplemented by a study of the leading cases on constitutional law. Second half-year, 3 hours.—PROFESSOR URDAHL.

C. *Contracts.*—Mutual assent and the necessity of its communication; offers and their expiration or revocation; necessity of consideration; requisites of contracts under seal; rights of benificiaries and assignees; joint and several contracts; alternative contracts; conditional contracts; illegality; impossibility; duress; discharge of contracts, or causes of action arising under them by rescission, novation, accord and satisfaction, release and other means. Texts: Anson on Contracts; Langwell's and Williston's Cases on Contracts. 2 hours. Given in 1905-1906 and every alternate year.—MR. HENRY MCALLISTER, JR.

D. *Torts.*—The nature of Torts; historical development; principles of liability; limitation of personal capacity; effect of a party's death; liability for the torts of agents and servants; general exceptions, inevitable accident, leave and license, ne-

cessity and self-defense; remedies; assault and battery; imprisonment; the family and business relations; defamation; wrongs of fraud and malice; wrongs to possession and property; trespass, waste, conversion, justification and excuse; nuisance; negligence, contributory negligence; special relations of contract and tort. Texts: Webb's Pollock on Torts; Ames and Smith's Cases on Torts. 2 hours. Not given in 1905-1906.—Mr. O. B. Willcox.

E. *Domestic Relations and the Law of Persons.*—Infancy; period of infancy; voidable acts, disaffirmance, ratification; contracts for necessaries; obligations created or authorized by law; liability for tort; guardian and ward. Marriage: promise to marry; marriage contract at common law and under statutes; rights of husband and wife in each other's property; status of married women; transactions between husband and wife; torts affecting marital relations; separation; divorce. Parent and child; custody, service and earnings. Texts: Tiffany on Domestic Relations, Woodruff's Cases on Domestic Relations. 2 hours. Given in 1905-1906 and every alternate year.—Mr. K. R. Babbitt.

F. *Property.*—Real and personal property; ownership of land; natural servitudes; easements; covenants as to use; public rights; franchises; rents, tenures; uses and trusts; joint ownership; estates; remainders, executory limitations; common law assurances and conveyances under the Statute of Uses. Texts: 207 to 508, Chase's Blackstone; Gray's Cases on Property. 2 hours. Not given in 1905-1906.—Mr. Henry C. Hall.

MATHEMATICS

Professor Cajori, Mr. Birchby and Miss Hubbard.

A. (*1.*) *Algebra.*—Series; The Binomial Theorem; Logarithms. Undetermined Coefficients; Theory of Equations. 4 hours till January.

A. (*2.*) *Solid and Spherical Geometry.*—Planes and lines in Space; Polyhedra, the Cylinder ,Cone and Sphere; Spherical Triangles. Second half-year, 2 hours.

A. (3.) *Plane Trigonometry.*—The functions of one and two angles; the solution of triangles; simple applications. 4 hours during January. Second half-year, 2 hours.

A. (4.) *Spherical Trigonometry.*—Second half-year, 2 hours.

B. (1.) *Analytical Geometry (Elementary).*—Plane Loci of first and second order. First half-year, 3 hours.

B. (2.) *Analytical Geometry (More Advanced).*—More thorough study of plane loci, some attention being given to modern methods. Second half-year, 3 hours.

C. *Calculus, Differential and Integral.*—First half-year, 3 hours. Second half-year, 4 hours.

D. *History and Logic of Mathematics.*—This course is planned especially for those who are fitting themselves to be teachers of Mathematics. One half-year, 2 hours.

E. **Modern Methods in Geometry.*—One half-year, 3 hours.

F. **Theory of Equations.*—One half-year, 3 hours.

H. **Determinants.*—One half-year, 2 hours.

J. *Theoretical Mechanics.*—Prerequisite, course C. This course is intended especially for students of engineering and mathematical physics. 4 hours.

I. *Elementary Surveying.*—Field work and computation. Fee, $4. Second half-year. 6 hours, field work; 2 hours, recitation, (counting as 3 hours).

ASTRONOMY

PROFESSOR LOUD.

A. *Elementary Astronomy.*—The descriptive, rather than the mathematical side of Astronomy, is emphasized. Text: Young's *Manual of Astronomy.* Essays are required. Second half-year, 3 hours.

B. *Observations and Computations.*—Prerequisite, Mathematics A (3). Astronomy A is recommended in preparation. The student is expected to make free use of the telescope and

*Of Courses E, F, and H only one or two are given in any one year.

transit instrument, and to use his observations in the solution of simple problems. First half-year, 3 hours (including the observatory work counted as laboratory periods.)

C. *Celestial Mechanics.*—The work of Moulton is used as a text-book. Prerequisite, Differential and Integral Calculus. 2 hours. First half-year or throughout the year.

D. *Elementary Meteorology.*—Prerequisite, Elementary Physics. Text: Davis' *Elementary Meteorology.* Second half-year, 3 hours.

E. *Field Astronomy for Engineers.*—Comstock's work of this title is used as a text. Second half-year, 3 hours.

F. *Stellar Photography.*—For this course the instruments placed by the Harvard College Observatory in the station near Colorado Springs, are available. One half-year.

PHYSICS

PROFESSOR SHEDD.

All of the courses offered in this department are undergradua courses. The aim is: (I.) To give an elementary knowledge of the fundamental principles of the subjects studied. To this class belong courses A, B, and H. (II.) To give a working knowledge to those expecting to teach. For this purpose there are offered, on the theoretical side, courses C and G; on the experimental side, course D. (III.) To meet the needs of the student of pure science. To this class belong courses E and K.

A. A general course. Three lectures per week, one recitation, 2 hours' laboratory work. Counts 3 hours.

First half-year—Mechanics, Heat, Sound.

Second half-year.—Light, Magnetism and Electricity.

B. Lectures and recitation as in Course A. Laboratory work four hours per week. Counts 4 hours. Those preparing to teach are advised to take this course.

H. *General Physics.*—This course is similar to Course B, except that the experiments are especially selected for engineering students. Counts 4 hours.

G. *Problem Work.*—Open to students who have taken or are taking A, B, or H. Counts 1 or 2 hours.

C. *Theoretical Physics.*—3 hours.

First half-year.—Light, including geometrical and physical Optics, or theory of Heat.

Second half-year.—Theory of Alternating Currents, or Electricity and Magnetism.

D. *Practical Physics.—Experiments in Mechanics*: Study of the balance; Borda, Kater and Foucault Pendulums; Elastic modulus by various methods; viscosity of liquids, soap films and Plateau figures; comparison of scales by comparator; hydrostatic pressures.

Experiments in Heat.—Calibration of thermometers by double points of H_2O and of other compounds; Heat equivalents of liquifaction and vaporization; relation of viscosity to temperature.

Experiments in Sound — Vibration of wires; longitudinal waves; resonance of forks and air columns; Lissajous' and Meld's experiments.

Experiments in Optics—Measurements of constants of mirrors; cardinal points of lenses; photometric measurements with Bunsen and Lummer-Brodhun photometers; study of the eye and its defects; study of diffraction patterns; spectrometer and interferometer work.

Experiments in Electricity and Magnetism — Study of the Earth's field; temperature variations of magnets; wireless signals; X-ray work with the static machine, induction coil and Tesla coil; electrodynamic laws.

The credit in any of these subjects will depend upon the time spent in the laboratory, two hours per week counting as one hour's credit.

E. *Advanced Physics.*—Lectures on Physical Constants and Instruments of Precision and on the Magnetic Circuit . Collateral reading and papers on assigned subjects. 2 hours.

K. *Precise Measurements in Electricity and Magnetism.*—I, E, and Q constants of galvanometers. Value of H of Earth's field.

H, B curves for iron. Hysteresis loop, comparison of E. M. F.'s Measurement of Resistances, Capacities and Inductances. 4 hours' laboratory work per week. Counts 2 hours.

NOTE—One year's preparatory physics and plane trigonometry are prerequisites for Courses A, B and H. Course A or B is a prerequisite for Courses C and D. Course A or B and a knowledge of the calculus are prerequisites for Courses E and K. In all laboratory courses a fee of $2.00 is charged for each credit of one hour for a half-year. In Courses A, B and H there is a laboratory-book fee of 25c each half-year.

CHEMISTRY

PROFESSOR STRIEBY AND PROFESSOR CRABTREE.

A. *Elementary Chemistry.*—Text-book work (chiefly Inorganic Chemistry) supplemented by lectures and discussions upon the fundamental laws, the application of chemistry to sanitary science, medicine and some of the arts, and also by occasional papers from descriptions in technical books, and by reports of visits to metallurgical and manufacturing establishments. Remsen's *College Chemistry.* 3 hours' recitation and 4 hours' laboratory work (counts 3 hours.)

B. *Advanced Chemistry.*—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulation of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. 3 hours' recitation or lectures and 4 hours of laboratory work (counts 3 hours.)

C. *Qualitative Analysis.*—Prerequisite, Chemistry A or equivalent. Experimental drill in obtaining characteristic reactions

of the more common elements, study of empirical formulæ and symbolic expression of reactions, solution of substances, separation of groups of elements, and finally analysis—first of simple salts and later of complex mixtures. The analytical work is confined almost wholly to inorganic substances, but includes certain common organic acids and a few organic bodies of general and medicinal use. 9 hours (counts 4).

D. *Quantitative Analysis.*—Prerequisite, Chemistry C. The laboratory work comprises determinations of single elements by approved methods, gravimetric and volumetric, followed by the analysis of selected salts, ores, slags, mineral water and commercial products. A few rapid or commercial determinations are given as the final work. The lectures treat of the methods of analysis, properties of precipitates, stoichiometry, sampling, reporting and the theory of solutions. The laboratory work occupies 3 consecutive hours 4 days a week (counts 4 hours.) Cairn's *Quantitative Analysis.*

E. *Organic Chemistry.*—Prerequisite, Chemistry A or B. Remsen's *Organic Chemistry.* Lectures and discussions of special subjects and processes. 3 hours' recitation and 3 hours' laboratory work (counts 3 hours.)

F. *Theoretical Chemistry.*—Prerequisite, Chemistry B. Text-book work with lectures and oral and written discussions. 3 hours.

G. *Medical Chemistry.*—Prerequisite, Chemistry B. Lectures, text-book, assigned reading and laboratory work. The study is mainly of substances, inorganic and organic, that are of importance in medical science and hygiene. Especial attention is devoted to the analysis of urine, water, milk, metallic poisons, and the use of disinfectants. The needful gravimetric determinations, considerable volumetric work with burettes and standard solutions, and microscopic and spectroscopic tests, supplement the usual qualitative examinations. 3 hours' recitation, 4 hours' laboratory work (counts 3 hours.)

H. *Agricultural Chemistry.*—Prerequisite, Chemistry B. A study of soils, fertilizers, foods and feeding; the analysis of soils, manures, water and dairy products. 3 hours.

The fee for every course must be paid in advance. It covers the cost of gas, chemicals and non-returnable supplies, except platinum. Glassware and

necessary apparatus (except platinum vessels) are loaned to the student and must be returned in good condition. The fees are as follows:

Course A	$ 7.00
Course B	8.00
Courses C, D, E and G, each	15.00

BIOLOGY

PROFESSOR SCHNEIDER.

A. *General Biology.*—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiation, heredity, evolution. First half-year: Laboratory study of typical green flowering plants, with special reference to the structure and function of their various organs; a comparative study of cryptogams, beginning with the simplest forms. Second half-year: Careful dissection of the frog and microscopic study of some of the more important organs; some of the simpler forms of animals. Recitations or lectures, 2 hours, and laboratory work, 4 hours (counts 3 hours.)

B. *Zoology.*—Prerequisite, Biology A. Lectures and recitations on the History of Zoology, Systematic Zoology, Morphology, and Embryology. Dissection of various classes and orders of animals up to chordata, with careful microscopic study of the finer structures. 6 hours (counts 3 hours).

C. *Physiology.*—Prerequisites, Biology A and Chemistry. Lectures, recitations and practical work by the student. The experimental work covers the following subjects: The physiology of ciliary motion; the general physiology of muscle and nerve tissue; phenomena of circulation, with countings of the blood-corpuscles and estimation of hæmoglobin; respiratory exchanges, movements, etc.; digestion and absorption; physiology of the spinal cord and brain; of the cutaneous sensations, taste, smell, hearing and vision. Some time is also given to lectures, with demonstrations, on the physiological action of the more important poisons. 6 hours (counts 3 hours.)

D.** *Comparative Anatomy of Vertebrates.*—Prerequisite, Biology

** Courses D, E and H will be offered in 1906-1907 and alternate years.

B. Careful dissection of the Amphioxus, Cyclostome, Fish, Amphibian, Reptile and Bird. Lectures, collateral reading, and recitation. First half-year, 6 hours (counts 3 hours.)

E** *Mammalian Anatomy.*—Prerequisite, Biology A. The work is based upon a detailed dissection of the cat. Other material is used to illustrate the anatomy of special organs. Lectures and collateral reading. Second half-year, 6 hours (counts 3 hours.)

F.* *Histology.*—Prerequisite, Biology A. A comparative detailed study of the tissues of the higher animals. Preparations of the principal tissues and organs are made and the common methods of preparation and mounting studied. Special microscopic drill is given in distinguishing the different tissues and organs. First half-year, 6 hours (counts 3 hours.)

G.* *Embryology and Cytology.*—Prerequisite, Biology F. A study of maturation, fertilization and cleavage of the ovum, early stages of the embryology of the chick and frog. Special attention is given to the differentiation and development of tissues and organs. Students make most of their own preparations. 6 hours (counts 3 hours.)

H.** *Bacteriology.*—Prerequisite, Biology A. Apparatus; culture media and methods of preparation; sterilization methods; microscopic characteristics of cultures of bacteria in general and of special forms, and methods of diagnosis; methods of obtaining pure cultures; methods of staining; bacteriological investigations of water, air, and soil. Students electing this course are expected to take Biology I. 5 hours (counts 2 hours.)

I. *Sanitary Science and Public Health.*—A lecture course. Some of the topics discussed are: Death and its causes; classification of diseases; ancient and modern theories of diseases; germ theory of infectious disease; direct causes and predisposing causes of disease; means of avoiding and resisting

*Starred courses are offered in 1905-1906 and alternate years.

**Courses D, E and H will be offered in 1906-1907 and alternate years.

disease; vehicles of disease, such as dust, sewage, water, etc.; brief sketch of the important transmissible and epidemic diseases, prophylaxis, etc. 1 hour.

J.* *Plant Physiology.*—Prerequisites, Biology A and Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First half-year, 6 hours (counts 3 hours.)

K.* *Systematic Botany—Seed Plants.*—Prerequisite, Biology A. Lectures on the principles of classification. A study of local flora is made, including the collection and determination of flowering plants. Some time is devoted to a study of the structural adaptations of plants to their surroundings. Second half-year, 3 hours.

Laboratory Fees: Courses E and K, each, $2.00; Course A, $2.50; Courses D, F, G and J, each, $3.00; B, C, H, each, $4.00.

GEOLOGY

Professor Finlay.

A. *General Geology.*—Prerequisite, Elementary Chemistry. Dynamical, Structural and Historical Geology. Lectures, required reading and field excursions on Wednesday afternoons until Thanksgiving. The student, while not required to do so, is advised to elect Mineralogy and Zoology before taking Geology, or at the same time with it. Texts: Chamberlin and Salisbury's *Geology,* Scott's *Introduction to Geology.* 3 hours.

B. *Mineralogy.*—Prerequisite, Elementary Chemistry. Required for Courses E and H. The economic or ore classification of minerals is used and the time is devoted chiefly to laboratory work in Descriptive and Determinative Mineralogy. Text: Moses and Parson's *Mineralogy, Crystallography and Blowpipe Analysis.* Laboratory fee, three dollars. Uniform individual working outfits are furnished at cost. 6 hours (counts 3 hours.)

E. *Economic Geology.*—Prerequisites, Geology and Mineralogy. Lectures and required reading. The geology and mineralogy

*Starred courses are offered in 1905-1906 and alternate years.

of the ore deposits of the United States, gold, silver, copper, lead, zinc, iron. The greater part of the second half-year is devoted to the consideration of coal, building stones, and the less important non-metallic minerals. In the spring there are voluntary field excursions to mining localities. Texts: Kemp's *Ore Deposits of the United States and Canada*, Kemp's *Economic Geology of the Non-metallic Minerals*. 3 hours.

F. *Invertebrate Paleontology.*—Lectures and laboratory work. Systematic study of the chief classes of the invertebrates by means of fossils, with special attention to the structure and development of the trilobites and brachiopods. Collections are made in the field to afford training in the identification of geological horizons. Second half-year, 3 hours. Offered in alternate years, 1904-1905 and 1906-1907.

G. *Vertebrate Paleontology.*—Lectures, laboratory work on the museum collections and required reading on the main lines of mammalian descent from the Eocene to recent times. Second half-year, 3 hours. Offered in alternate years, 1905-1906 and 1907-1908.

H. *Petrography.*—Prerequisites, Courses A and B. Lectures and laboratory work with the microscope on the commoner rock-forming minerals and the principal rock types. First half-year, 3 hours.

I. *Field Geology.*—The systematic investigation in the field of 150 square miles immediately adjacent to Colorado Springs with the preparation of maps and a report. Individual work under the guidance of the instructor.

BIBLE STUDY

PROFESSOR PARSONS.

The following courses are offered in successive years:

I. Introduction to the Books of the New Testament.
II. The Life of Christ (2 years).
III. Old Testament Literature.
IV. The Life of Paul.

In 1905-1906 the class will study Course III.

The class meets one hour a week.

MUSIC

For such students as desire courses in Music, the following are provided: Piano, organ, violin, voice, harmony, counterpoint and composition. Of these, only harmony, counterpoint and composition are counted towards a degree. Courses in Music are not included in the regular tuition fee. The charges for each half-year for two lessons a week are as follows:

CLASS LESSONS, ONE HOUR LONG.

Piano-forte, violin, voice, each	$25.00
Harmony	12.00
Counterpoint	18.00
Composition	22.50

PRIVATE HALF-HOUR LESSONS.

Piano-forte, violin, voice, organ, each	$35.00

Rent of Piano, one hour each day, for one half-year	3.00
Rent of Piano, two hours each day, for one half-year	5.00
Rent of Piano, each additional hour, for one half-year	2.00
Rent of two-manual organ, 1 hour each day, for one half-year	5.00
Rent of three-manual organ, 1 hour each day, for one half-year	10.00

Students of Music register with the Dean of the College. They will be accepted only on payment of a full term's tuition. No deduction will be made for absence from lessons, except on account of prolonged illness.

Honors and Scholarships

Scholarship Honors of two grades are awarded at Commencement for excellence in the work of the year. The Honor list for 1903-1904 was as follows:

HIGH HONORS.

Jean Rose Ingersoll, '05.
Mabel Jencks, '04.
Alice Isabel Kidder, '06.
Laura Stiles, '05.
Sarah Foss Wolverton, '04.

HONORS.

Maurice C. Hall, '05.
Violet Louise Holcomb, '06.
Mary Card Porter, '05.
Ella Louise Warner, '04.

PERKINS SCHOLARS.

Donald Tucker, '06.
Alice Isabel Kidder, '06.

HAWLEY SCHOLARS.

Cornelia Ball, '06.
Lola May Davis, '05.
Bessie Gordon, '06.
Sarah McDowell, '05.
Mary Card Porter, '05.
Ruth Ragan, '06.

C. C. HEMMING SCHOLAR.

Maurice C. Hall, '05.

MARY G. SLOCUM SCHOLAR.

Victor E. Keyes, '05.

HASTINGS PRIZES.

1. W. M. Vories, '04.
2. P. D. Rice, '04.
3. Sarah Foss Wolverton, '04.

THE D. A. R. PRIZES.

1. Lola May Davis, '05.
2. Florence Haynes, '05.

The Master's Degree

The Master's degree is conferred subject to the following conditions:

(1). The applicant must have received the Bachelor's degree from some reputable college or university.

(2) If the applicant becomes a resident student of Colorado College, he must pursue a minimum course of nine hours of advanced work a week for one year. The work shall include both a major and a minor subject, and at least five hours a week shall be taken in the major subject. In addition, the applicant must present a satisfactory thesis on a subject approved by the Faculty, such thesis to represent the equivalent of at least three hours of lectures a week for one year.

(3) In case of non-residence, the applicant must select a major and a minor subject, and complete a minimum requirement equivalent to twelve hours of lectures a week for one year, of which the equivalent of seven hours must be in the major subject, and at least two academic years must elapse before the degree is conferred. A thesis is required, as in the case of the resident student.

The thesis must be presented to the Faculty not later than May 15. It must be typewritten on paper of a prescribed size, and a copy deposited with the College librarian.

The last date of registration for post-graduate students is October 15.

The fees are $20 a year for tuition, $5 for the diploma, and $1 to bind the thesis.

Applications for the Master's degree should be sent to the Chairman of the Faculty Committee on Post-Graduate Degrees, who will furnish information about courses.

School of Engineering

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.,
President.

FLORIAN CAJORI, Ph. D.,
Dean and Head Professor of Mathematics.

LOUIS A. E. AHLERS, A .M.,
Head Professor of Modern Languages and Literatures.

WILLIAM NOEL BIRCHBY, A. B.,
Instructor in Mathematics.

CHARLES G. COLLAIS,
Superintendent of Mechanical Laboratories.

FRED CRABTREE, B. S.,
Professor of Mining and Metallurgy.

(To be appointed.)
Assistant Professor of Electrical Engineering.

GEORGE IRVING FINLAY, Ph. D.,
Professor of Geology, Mineralogy and Paleontology.

ELIJAH CLARENCE HILLS, A. B.,
Professor of the Romance Languages and Literatures.

FRANK HERBERT LOUD, Ph. D.,
Professor of Mathematics and Astronomy.

GEORGE J. LYON, C. E.,
Professor of Civil Engineering.

HOWARD MOORE, C. E.,
Instructor in Drafting and Machine Design.

SIDNEY F. PATTISON, A. B.,
Assistant Professor of English.

JOHN CUTLER SHEDD, PH. D.,
Professor of Physics.

HUGH ALLISON SMITH, A. M.,
Professor of French.

WILLIAM STRIEBY, A. M., E. M.,
Professor of Chemistry and Metallurgy.

ORGANIZATION OF THE SCHOOL.

The present rapid development of Colorado and the West has created so imperative a demand for instruction in pure and applied science that the Trustees of Colorado College, at a meeting held on Dec. 26, 1902, decided to add to the existing departments of the institution a School of Engineering. Colorado Springs is admirably situated for such a school. The suburban electric railway takes the student to three different plants for the reduction of ore; the mines of Cripple Creek and the metallurgical works of Pueblo are near by; there are in the neighborhood fine examples of mountain railway construction and large electric plants with machinery of modern type. The Hydro-Electric Company is now completing its power plant near Manitou, in utilization of what is the highest head ever developed in hydraulic engineering. By careful study of local engineering problems and by close contact with the engineering establishments of this vicinity, it will be possible to secure a thorough blending of theoretical and practical instruction.

This year the studies of the Freshman, Sophomore, and Junior courses are given. In 1905-1906 the entire curriculum of four years will be offered. To carry out the Senior schedule, considerable new equipment will be added to the laboratories. The present college buildings furnish ample accommodations for the work in engineering.

REQUIREMENTS FOR ADMISSION.

The requirements for admission to the engineering courses are as follows:

1. MATHEMATICS—(*a.*) Algebra through simultaneous quadratic equations; (*b.*) Elementary Plane Geometry; (*c.*) Solid and Spherical Geometry. Plane Trigonometry is desirable, but not necessary. For a full description of the requirements in Mathematics, see p. 21. A thorough preparation is of great importance. Students are advised to review Algebra during the last year of the high school course.

2. PHYSICS—One year's course. See p. 23.

3. CHEMISTRY—One year's course. See p. 23.

4. BIOLOGY—One year's course. In place of Biology may be substituted an equivalent amount of Botany, Physiology, Physiography, or Geology, any two of these to be counted the equivalent of Biology.

5. English—As in the department of Liberal Arts. See p. 20.

6. Foreign Languages—Two years. See pp. 21-23.

7. American or English History—One year's course. See p. 20.

DEGREES.

At the completion of an engineering course the student will receive the degree of Bachelor of Science, with a specific designation of the engineering course taken.

THESIS.

Each student will be required to present, before graduation, a thesis on some engineering subject embodying investigations of his own.

SUMMER MEMOIRS.

A description of some engineering work, containing from three to five thousand words, is required of all students of the Engineering School at the beginning of the third and fourth college years.

THE PIKE'S PEAK POLYTECHNIC SOCIETY.

The Pike's Peak Polytechnic Society, which was organized, November, 1904, has a large membership, composed of engineers of the Pike's Peak region. Its meetings are held in one of the buildings of the college and the members have access to the engineering library of the college. Students of the School of Engineering are associate members of the society and at its meetings enjoy the privilege of personal contact with prominent engineers.

ENGINEERING LIBRARY.

Since the opening of the engineering school a considerable library of technology has been accumulated. The first acquisition consisted of the private library of the late Professor R. S. Miller of Purdue University, which is particularly strong along the lines of mechanical engineering. This year a large number of new engineering books has been purchased, and books are now placed on the shelves for reference by members of the Pike's Peak Polytechnic Society. A considerable number of technical journals has been secured. The College has now a complete set of the Engineering Record

(formerly called the Sanitary Engineer) and of the Mineral Industry, and nearly a complete set of the Van Nostrand's Engineering Magazine, Scientific American, and Scientific American Supplement. It has the recent volumes of the Engineering Magazine, Cassier's Magazine, Engineering News, Engineering and Mining Journal, Electrical World, Electrical Engineer, Electrical World and Engineer, Electrician (London), Technology Quarterly, Municipal Engineering, American Machinist, Journal of the Franklin Institute. It has the current numbers of Ores and Metals, Mining Industry, Chemical News, Journal of the American Chemical Society and Fresenius Zeitschrift. It has the recent transactions of the American Institute of Mining Engineers, American Institute of Electrical Engineers, American Society of Civil Engineers, the American Society of Mechanical Engineers. The library has the Reports of the (Colorado) State Engineer, as well as the reports of the United States Geological Survey, United States Coast Survey, United States Chief Engineer, United States Chief of Ordnance, and the United States Publications on Irrigation. Over twenty other engineering journals are taken by the Pike's Peak Polytechnic Society, to which the faculty and engineering students have free access. Altogether the list of journals within reach of the students is large. Some important engineering books and journals have been received as donations. Captain L. E. Berthoud, of Golden, Henry Hine and George C. Hewett, of Colorado Springs, gave several volumes; Mr. M. Kirkman, of Chicago, gave a complete set of his "Science of Railways"; Mr. John Herron, of Telluride, gave fourteen volumes of the Transactions of the American Society of Civil Engineers and six volumes of the Journal of the Association of Engineering Societies. Mr. B. H. Bryant, Chief Engineer of the Midland Road, has loaned the College, for the use of the Engineering School and the Pike's Peak Polytechnic Society, twenty-six volumes of the Engineering News, twelve volumes of the Railroad Gazette and other publications, amounting to over one hundred volumes.

LABORATORIES AND EQUIPMENT.

The Physical Laboratory. See p. 94.

The Chemical Laboratory. See p. 96.

The Mechanical Laboratories. It is desirable that engineering students should acquire some practical knowledge in carpentry, wood turning, machinist's bench and vise work, and blacksmithing. To carry on this work, there have been fitted out three laboratories, which are supplied with heat and electric light.

1. *Wood Laboratory.*—This is equipped with heavy maple-top benches, each having a tool cabinet furnished with the best make of tools, comprising Bailey planes, Buck Brothers' chisels, Disston saws, etc. The pattern-making department is equipped with six wood-turning lathes, also hand saws, planes, table saw clamps, hand screws and tool sharpening machinery.

2. *Forging Laboratory.*—This is furnished with iron blast forges, anvils, benches, vises, tools, swage blocks, lockers, etc.

3. *Iron Laboratory.*—This is equipped. with machinists' benches, bulldog vises, and drawers containing individual sets of tools; also with two Bradford engine lathes, a screw-cutting lathe, a shaper, a drillpress, emery wheels, machine hacksaw, grinding machinery, etc. As need arises other equipment to this and the other mechanical laboratories will be added. The power in the mechanical laboratories is supplied by a 20-H.P. steam engine.

The Testing Laboratory.—For experiments upon the materials of construction a 100,000 pound Riehle testing machine is available, with the necessary accessories for making tensile, compressive and tranverse tests. This machine is used by each student to make a series of tests upon the resisting properties of wood, brick, concrete, stone, wrought iron, cast iron and steel.

The Cement Testing Laboratory is equipped with a Fairbanks testing machine, sand and cement sieves, briquette moulds, Gilmore's needles, as well as the necessary tanks and other apparatus requisite for investigations in the nature and physical properties of cement and cement mortars. All students are required to make and test briquettes of cement and cement

mortar as well as to determine the weight, fineness and other physical properties of such cement, sand, and mortar as may be assigned to them for examination.

The Hydraulic Laboratory, furnished with an ample supply of water, is available to supplement with practical exercises the courses in theoretical hydraulics. It is about to be equipped with a tank arranged as a channel, across which weirs of different shapes and sizes may be placed and in which orifices may be arranged for the purpose of determining hydraulic constants; with apparatus for experiments in connection with the flow of water through pipes; with several types of water meters including a Venturi meter; with pressure gages, differential gages, thermometers, etc., as well as with the portable tanks and scales usually found in such laboratories. A Hug water motor is also available for experimentation.

The Assay Laboratory is equipped with twenty-two muffle furnaces for solid fuel, and crucible and muffle furnaces for gasoline; also a large furnace of reverberatory type for handling a large number of fusions at one time; ore bins, fuel bins, two power crushers, steel sampling floor and table; twelve new pulp balances and several button balances, including two of the highest grade made by Ainsworth, of Denver. It is also supplied with a large number of checked ore samples of various grades and kinds, many of them donated by the American Smelting and Refining Company, the Ohio and Colorado Smelting and Refining Company, the United States Reduction and Refining Company, the Portland Mining and Milling Company, the Elkton Mining Company, Mr. E. C. Woodward and others.

The Metallurgical Laboratory equipment will be installed in the course of this year. It will include two reverberatory furnaces for roasting and smelting, a set of iron kettles for desilverizing base bullion, tanks for cyanide and lixiviation tests of gold and silver ores, a chlorination barrel, amalgamation pan, a Berthelot calorimeter, a Le Chatelier pyrometer, Seger cones, and furnace for fusibility and heat treatment experiments.

The Mining (Ore-dressing) Laboratory will be equipped before the fall of 1905 with ore crushers and grinders of the Blake and Gate types, screens, crushing rolls, jigs, a ball grinding mill, hydraulic classifiers, two or more concentrating tables, and slime tables.

The Electrical Laboratory.—Besides the apparatus in the Physical Laboratory proper, the College has the following equipment for electrical engineering, part of which was secured at the Louisiana Purchase Exposition in St. Louis: Western Union Test Set (Willyoung and Gibson), Portable Test Box (Willyoung and Gibson), Model K. Test Set (Willyoung and Gibson), Whitney Test Set (Willyoung and Gibson), four Box Bridges (Willyoung and Gibson), three Slide Wire Bridges, Rowland D'Arsonval Galvanometer (Leeds and Company), Rowland D'Arsonval Galvanometer, differentially wound, four Wall D'Arsonval Galvanometers (Willyoung and Gibson), Dial Faradmeter (Willyoung and Gibson), three Ayrton Universal Shunts, Students' Volt-Ammeter (Whitney make), Cardew Hot Wire Volt Meter, two Thomson Inclined Coil Voltmeters (General Electric Company), three Thomson Inclined Coil Ammeters (General Electric Company), three Thomson Inclined Coil Watt meters (General Electric Company), Hopkins Yoke Permeameter (Willyoung and Gibson), Bridge for Determining Small Inductances (Siemens and Halske), (fixed) Standard of Self-Induction (Siemens and Halske), (variable) Standard of Self-Induction (Willyoung and Gibson), Standard Magnetic Balance after DuBois (Siemens and Halske), Electrometer after Beggerow (Siemens and Halske), Standard of Induction with secondary (Hartmann and Braun), Apparatus for Determining Magnetic Qualities of Iron (Hartmann and Braun), Student's Magnetometer (Cambridge, Eng., Sci. Soc.), Resistance Thermometer (Cambridge, Eng., Sci. Soc.), Three-Meter Optical Bench with Lummer-Brodhun Screen (Willyoung and Gibson), 4½ amp. 110 volt D. C. Arc Lamp, 8 amp. 110 volt D. C. Arc Lamp (presented by the Colorado Springs Electric Light and Power Company), ten-light Stanley Type C Transformer, ten amp. Federal Recording Wattmeter, small 52 volt Emerson Non-Induction Motor, small ten volt A. C. Induction Wagner Motor, Ft.

Wayne-Wood 14 pole ½ H. P. Motor, 110 volt 10 light Fidelity Generator, ½ H. P. Excelsior Arc Motor, ½ H. P. General Electric Induction Motor (hand start), ½ H. P. H. J. Evans Special D. C. Generator, two 15 H. P. Sprague Street Car 500 volt motors (presented by the Rapid Transit Company, of Colorado Springs), two 15 K. W. General Electric direct connected 110 volt Generators, one 30 K. W. General Electric direct connected 110 volt Generator, 25 H. P. General Electric 110 D. C. Motor, 15 H. P. Thomson-Houston 110 volt D. C. Motor.

Eleven electro-dynamometers and galvanometers of the Siemens and Halske type have been purchased from the Gregory Electric Company, in Chicago. This company has donated to the Engineering School the following pieces of apparatus which are of great historical interest: A Thomson-Rice Arc Ammeter, an enclosed arc lamp, a national potential indicator, a stand ammeter, a Thomson-Houston ground-detector, a Westinghouse ammeter, a Westinghouse voltmeter, an Edison ammeter, an Emerson induction fan-motor, a Westinghouse single pole fan-motor, a Westinghouse compensator, a General Electric lightning arrester, a Shallenberger wattmeter.

In service or for purely experimental purposes the college has in all 16 generators and motors, aggregating a little over 100 K. W. of power.

Orders have been given for a number of Weston standard Voltmeters and Ammeters. In 1905-1906 more equipment will be added for the study of alternating current machinery.

Surveying.—The school possesses a good working equipment of engineers' field instruments, including transits, levels, a solar attachment and a plane table, as well as smaller instruments and accessories. Each student is required to adjust and learn to use all of the field instruments.

Boiler Testing.—One of the four boilers at the heating plant is available for experimental purposes.

Lantern Slides and Photographs.—The engineering school has between two and three hundred lantern slides, prepared by the late Professor R. S. Miller, on steam engineering, machine

design, etc., and fifty metallurgical slides, donated by Mr. F. C. Clerc, of Denver. The College has also a representative collection of blue prints and photographs of important engineering structures.

Geometrical Models.—For illustrating subjects in Descriptive Geometry and Graphic Statics there are in the Drafting Room a number of models prepared by students. This collection includes half a dozen thread models of ruled surfaces. In the mathematical class-room there are a number of models of wood and of plaster of Paris.

MINING ENGINEERING COURSE.

The course in mining engineering is designed to give the student a thorough grounding in the theoretical principles upon which the successful practice of mining and metallurgy must rest, to train the student to the habit of investigation, and to familiarize him with current and past practice, especially that in successful up-to-date plants. With this in view there are included, in addition to the courses on mining, metallurgy and geology, thorough courses in mathematics, physics, chemistry, theoretical and applied mechanics, and briefer courses in steam and electrical engineering, surveying and mining law. During the Senior and Junior years frequent visits will be made to neighboring mines and metallurgical plants.

FRESHMAN YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Algebra (Math. A1)	5	Trigonometry (Math. A3)	3
Advanced Chemistry (Chem. B)	7	Descriptive Geom. (Mech. Draw. B)	9
Drawing (Mech. Draw. A)	6	Advanced Chem. (Chem. B)	7
Woodwork (Shop Work A)	6	Elem. Surveying (Civil Eng. A)	8
Rhetoric and Composition (English B)	3	Rhetoric and Comp. (Eng. B)	3
Modern Languages	3	Modern Languages	3

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	3	Analytical Geometry (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Qualitative Analysis (Chem. C)	7	Quantitative Analysis (Chem. D)	7
Gen. Physics (Phy. H)	7	Gen. Physics (Phy. H)	7
Mineralogy (Geol. B)	6	Mineralogy (Geol. B)	6
Machine Design (Mech. Draw. C)	4	Modern Languages	2
Modern Languages	2	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.		*Second Half-Year.*	
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
General Geology (Geol. A)	3	Testing Laboratory	3
Quant. Anal. (Chem. D)	9	General Geology (Geol. A)	3
Mine Surveying (C. E. AM)	5	Assaying (Met. A)	9
Masonry Structures (C. E. E)	2	Iron and Steel (Met. B & C)	3
Steam Engineering (Civil Eng. M)	2	Mining Engineering (A)	3
		Steam Engineering (Civil Eng. M)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.		*Second Half-Year.*	
Economic Geology (Geol. E)	3	Petrography (Geol. H)	3
Hydraulics (Civ. Eng. H)	2	Mine Plant and Equip. (Min. Eng. C)	3
Ore Dressing (Min. Eng. B)	3	Electric Machinery (Elect. Eng. I)	2
Mining Engineering (A)	2	General Metallurgy (E)	1
Electric Machinery (Elect. Eng. I)	2	Electro Metallurgy (Met. D)	1
Non-Ferrous Metallurgy (Met. C)	3	Mining and Met. Laboratories	9
Mining and Met. Laboratories	9	Memoirs and Abstracts	1
Mining Law	1	Thesis.	
Memoirs and Abstracts	1		
Thesis.			

CIVIL ENGINEERING COURSE.

The four years' course leading to the degree of Bachelor of Science in Civil Engineering is designed to afford a thorough analytical training, as well as numerous and extended practical exercises in those matters that pertain to the profession of the civil engineer, including all kinds of structures and public works and also the various developments and applications of power by the use of electric, steam, water and air motors.

The theoretical portion of the instruction is based largely upon the courses given in the departments of mathematics and physics and the results obtained are applied to practical engineering work. Special stress is laid upon the design by the student of the various structures and machines which the civil engineer is called upon to construct in the practice of his profession.

The instruction is given by lectures, demonstrations by the student, and frequent conferences, co-ordinate with which the work of design is carried on. It covers comprehensively the subjects of surveying, water supplies of cities and towns, irrigation, sanitary engineering, including sewage disposal, graphic and analytic treatment of all metallic structures, foundations, retaining and reservoir walls, high masonry dams, sewer systems, hydraulic engineering, rivers and harbors, hydraulic steam and electric motors.

FRESHMAN YEAR.

As in the Mining Engineering Course.

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	2	Analytical Geom. (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Gen'l Physics (Phys. H)	7	Gen'l Physics (Phys. H)	7
Mineralogy (Geol. B)	6	Petrography (Geol. H)	3
Machine Design (Mech. Draw. C)	4	Graphic Statics (Mech. Draw. D)	4
Modern Languages	2	Modern Languages	2
Field Astronomy (Astr. E)	3	Forging (Shop Work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
Hydraulics (Civ. Eng. H)	2	Testing Laboratory	3
Steam Engineering (Civ. Eng. M)	2	Theory of Trusses (Civ. Eng. C)	3
Masonry and Structures (Civ. Eng. E)	2	Steam and other Motors (Civ. Eng. M)	2
Advanced Surveying (Civ. Eng. AA)	8	Railroad Surveying (Civ. Eng. G)	4

Summer Memoir.

SENIOR YEAR.

First Half-Year.		*Second Half-Year.*	
Foundations (Civ. Eng. F)	2	Design of Bridges and Buildings (Civ. Eng. D)	4
Design of Bridges and Buildings (Civ. Eng. D)	4	Irrigation (Civ. Eng. J)	2
Railroad Engineering (Civ. Eng. G)	4	Sanitary Engineering (Civ. Eng. K)	3
Water Supply (Civ. Eng. I)	3	Roads & Parks (Civ. Eng. L)	3
Elementary Law	3	Mining A	3
Electrical Machinery (Elec. Eng. I)	3	Electrical Machinery (Elec. Eng. I)	2
Thesis.		Thesis.	

IRRIGATION ENGINEERING COURSE.

In order to meet the demand for men trained in the design, location and construction of irrigation works, a special course in irrigation engineering is offered. The first year of this course is the same as in the Civil Engineering course; the second, third and fourth years differ from the regular Civil Engineering course in the substitution of special work in agricultural chemistry, soil physics, advanced work in hydraulics, and the design of stone, timber and steel irrigation structures for those subjects that bear less directly

upon irrigation problems. The full equipment of the Civil Engineering department, including surveying instruments, testing machines, hydraulic laboratory and maps and plans, are available to the students of Irrigation Engineering.

The course differs from that in Civil Engineering in the following respects:

SOPHOMORE YEAR.—Agricultural chemistry (Chem. H) takes the place of Geology B during the first half-year and of Astronomy E during the second half-year.

JUNIOR YEAR.—During the second half-year Soil Physics, Irrigation (Civ. Eng. I) and Masonry Structures (Civ. Eng. E) take the place of Theory of Trusses (Civ. Eng. C), Railroad Surveying (Civ. Eng. G).

SENIOR YEAR.—During the first half-year Irrigation Law and Hydraulic Engineering (Civ. Eng. N) take the place of Railroad Engineering (Civ. Eng. G) and Elementary Law. During the second half-year Hydraulic Engineering (Civ. Eng. N) and Agriculture take the place of Roads and Parks (Civ. Eng. L) and Mining A.

ELECTRICAL ENGINEERING COURSE.

This course embraces a considerable amount of work usually done in Mechanical Engineering. The work in the study of Electricity begins in the Sophomore year, when in the Physics course the fundamental laws of Electricity and Magnetism are studied and the fundamental experiments performed in the laboratory.

The last two years include a course in Electromagnetism, Steam Engineering, the testing of dynamos and motors, the study of Alternating Current Machinery, the transmission of power and the industrial applications of Electricity.

The numerous plants in and about Colorado Springs afford unusual opportunity for the study of the application of electricity to long-distance transmission, to mining and smelting, to street car service and city lighting.

FRESHMAN YEAR.

As in the Mining Engineering Course, except that Shop-work B takes the place of surveying during the second half-year.

SOPHOMORE YEAR.

As in the Mining Engineering Course, except that Mineralogy (Geol. B) will be replaced during the first half-year by Shop-work C, and during the second half-year by Graphic Statics (Mech. Draw. D).

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
Hydraulics (Civ. Eng. H)	2	Steam Engineering (Civ. Eng. M)	2
Steam Engineering (Civ. Eng. M)	2	Electro-magnetism	5
Precise Measurements (Phys. K)	2	Generation and Transmission of Power (Elec. Eng. B)	2
Machine Work and Tool Making (Shop-work D)	2	Machine Design (Mech. Draw. E)	2
Electro-magnetism (Elec. Eng. A)	5	Testing Laboratory	3

Summer Memoir.

SENIOR YEAR.

First Half-Year.		*Second Half-Year.*	
Alternating Currents (Elec. Eng. C)	5	Alternating Currents and Theory of Transformers (Elec. Eng. C)	5
Testing Direct Current Dynamos (Elec. Eng. D)	2	Elec. Railways (Elec. Eng. F)	3
Engine and Boiler Trials	2	Elec. Lighting (Elec. Eng. G)	5
Gas Engines	1	Electricity in Mining and Quarrying (Elec. Eng. H)	1
Central Station Design	2	Inspection Tours.	
Elementary Law	3	Thesis.	
Thesis.			

DEPARTMENTS OF INSTRUCTION.

MINING

PROFESSOR CRABTREE.

The instruction in mining begins at the opening of the second term in the Junior year, and continues through the course. The lectures and recitations will occupy three or five hours each week and will be supplemented by study of text-books and journals and illustrated by models, photographs, etc. The lectures are divided into courses as follows:

A. *Ore Deposits, Prospecting, Exploration*—Boring by drop tool system, diamond drilling ,excavation and tunneling, shaft sinking, timbering, ventilation, accidents, hydraulic mining.

B. *Ore Dressing*—Crushing, screening, milling and concentration of ores by jigs, hydraulic classifiers, shaking tables, vanners, slime tables, etc. Mechanical preparation of coal.

C. *Mine Plant and Equipment*—Machinery and appliances used in transportation, hoisting and storing of materials, in generating and transmitting power; compressors, electrical machinery, air drills, etc.

D. *Laboratory.*—A course of experimental work in crushing, screening, classification and concentration of ores. In this course it is expected to illustrate the theoretical principles of ore dressing and analyze each step in the process.

METALLURGY

PROFESSOR CRABTREE.

The study of Metallurgy begins at the opening of the second term of the Junior year, and continues throughout the course. It includes lectures, study of text-books and journals, laboratory experimental work, and visits to mining and metallurgical plants. The lectures will be illustrated by lantern slides, photographs, blue prints, models, and samples of ores and products.

A. *Fire Assaying.*—The course in fire assaying is given three afternoons each week in the second term of the Junior year, and includes lectures and recitations on the theory and practice of sampling, fluxing and assaying of gold, silver, lead and copper ores, bullion and mattes, as well as practical work in the laboratory. Each student will be required to make a large number of careful and accurate assays of various grades and kinds of ores, of copper mattes, and of bullion, using the scorification, crucible and combination methods. Wet methods for ores, mattes, slags and fuels are taught by a thorough course in the Quantitative Chemical laboratory. Fee, $15.

B. *Iron and Steel.*—Careful study of the ores, fuels, fluxes; theoretical principles and the processes of manufacture of pig iron, wrought iron, Bessemer and Open Hearth steel, cement and crucible steel; physical and chemical properties of iron and steel; commercial and engineering specifications.

C. *Non-Ferrous Metallurgy.*

Lead Ores; roasting of ores; fluxes and slags; smelting, in blast furnace and in reverberatory furnace; desilverization of base bullion; cupellation.

Copper Ores; roasting of ores; smelting in reverberatory and in blast furnaces; pyritic smelting; refining in converter, in reverberatory, by electrolytic processes, wet processes.

Silver—Study of Patio, Washoe, Reese River, Boss, Ziervogel, Russell and other processes for the extraction of silver from its ores.

Gold—Crushing, roasting and milling of gold ores; amalgamation; chlorination process; cyanide process; melting and refining.

Also a brief review of the metallurgy of zinc, aluminum, tin, mercury and platinum.

D. *Electrometallurgy*—A study of the present-day applications of electricity to smelting and refining.

E. *General Metallurgy*—Properties of metals and alloys; heat treatment of metals; fuels; refractories; pyrometry; metallography. Fee, $4.

CIVIL AND IRRIGATION ENGINEERING

PROFESSOR LYON.

A. *Theory and Practice of Surveying.*—Construction, use and adjustment of instruments; pacing survey; contouring and levelling by hand level; theory of stadia measurements; azimuth traverse; balancing survey. Four hours' credit, second half, Freshman year. Two recitations and two afternoons' field or office work. *Required of Civil, Irrigation and Mining Engineers. Fee, $4.*

AA. *Advanced Surveying.*—Topographic, hydrographic, city and mining surveying; instruments and field methods used in geodetic surveying. Simple, compound and reversed railroad curves; turnouts and switches; theory of earthwork computations. Two recitations and six hours of field or office work, first half, Junior year. *Required of Irrigation and Civil Engineers.* Fee, $4.

AM. An abridgement of Course AA, for Mining Engineers. Two hours' recitations, and three hours' field or office work, first half of Junior year. Fee. $2.

B. *Resistance of Materials.*—Laws of elasticity in homogeneous materials; coefficients of elasticity; relations between stresses and strains; common theory of torsion and flexure; elastic limits, working stresses and ultimate resistances of wrought iron, cast iron, steel, alloys, timber, building stones, concrete and masonry; simple and continuous beams; design and construction of iron, steel, and timber columns and beams, including design of plate girders; shafts; cables, specifications. Three hours' lectures and recitations during Junior year, with work in the cement and testing laboratory. *Required of all engineers.* Fee, $4.

C. *Theory of Trusses.*—The truss element; simple, cantilever and noncontinuous trusses with parallel chords; fixed and moving loads; through and deck spans; position of any system of concentrated moving loads for greatest chord and web stresses, when chords are both parallel and not parallel; combination of analytical and graphic methods; skew and irregular trusses; applications to bridge and roof trusses; arched ribs. Three

hours credit, second half, Junior year. Lectures and recitations with problems and design work. *Required of Civil Engineers.*

D. *The Design and Construction of Bridges, Roofs and Buildings.*—Railway and highway bridges; pin and riveted connections; single and multiple systems of bracing; the design of details for bridges, roofs and buildings; floors for railway and highway bridges; design and operation of draw bridges, including engines, locking, lifting and turning machinery; cantilever structures; wind loads and stresses; single and double track viaducts or trestles in iron, steel and timber; complete design of a railway bridge, with estimates of cost. Four hours' credit, Senior year. Lecture, recitations and design work in the drawing room. *Required of Civil Engineers.*

E. *Masonry Structures.*—Cement, concrete and masonry; pressure and abutting power of earth; design and construction of retaining walls; stability of masonry structures, including towers and chimneys; theory and design of arches; theory and design of reservoir walls, earth and high masonry dams. Two hours' credit, Junior year. Recitations, lectures and design work in the drawing room. *Required of Civil and Irrigation Engineers. Mining Engineers take first half of this course.*

F. *Foundations.*—Foundations for buildings; safe loads on masonry and foundation beds; examinations of foundation sites; pile driving and pile foundations; sheet piling and cofferdam methods; pneumatic foundations and caisson work; open dredging; bridge piers of masonry and steel; piers for deep foundations; tunneling. Two hours' credit, first half, Senior year. Lectures and design work. *Required of Civil and Irrigation Engineers.*

G. *Railroad Engineering.*—Reconnaisance; preliminary survey; location; cross-sections; transition-curves; earth-work computation; turnouts, yard and switch work; sources and value of train resistance; the relation of curvature and grades to velocity and maximum train load; effect of momentum; balance of grades for unequal traffic; analysis of operating expenses; cost of extra distance, curvature, rise and fall and of additional trains; effect of road bed on cost of running trains; economic value of distance, curvature, rise and fall, and of grades;

pusher grades; value of additional traffic; improvement of old lines; ordinary and extraordinary methods of drainage; water supply, its quality, storage and delivery; construction of wooden trestles and masonry culverts; standard plans; estimate of cost. Four hours' credit, second half, Junior year and first half, Senior year. Lectures, recitations, field work, problems and design work. *Required of Civil Engineers.*

H. *Hydraulics.* Flow of water through orifices; time required for discharge of canal locks and similar volumes; weir discharge and gauging by weirs; gauging of water for irrigation systems; flow through and discharge of pipes; design of pipe systems; the Venturi meter; flow in and discharge of open canals and in rivers; gauging streams. Two hours' credit, first half, Recitations and problem work. *Required of Junior Civil Engineers and of Senior Mining Engineers.*

I. *Water Supply.*—Rainfall and storage; flow of streams; influence of soils, elevation and geologic characteristics of watershed; methods of supply; underground flow; reservoir construction; distributing systems; house-supply and wastage. Three hours' credit, first half, Senior year. Recitations, collateral reading and design work. *Required of Civil and Irrigation Engineers.*

J. *Irrigation Engineering.*—Irrigation of land; amounts and periods of application; grades, cross-section and capacity of canals; surveys for irrigation works; source of water supply; hydrographic data; Colorado streams; return and seepage waters; irrigation by pumping. Two hours' credit, second half. Lectures, recitations and assigned reading. *Required of Civil Engineers in Senior Year and of Irrigation Engineers in Junior year.*

K. *Sanitary Engineering.* Treatment and disposal of sewage and refuse by sedimentation, precipitation and use of septic tanks; treatment of effluent by continuous and intermittent sand filtration; fertilization; disposal of sludge; sand filters; pollution of potable water, and its purification by continuous and intermittent sand filtration; sewage and surface drainage of cities and towns; separate and combined systems of sewers;

capacity of mains and branches; catch-basins, manholes; flush-tanks; outfalls; grades and sections; flow and discharge of sewers; construction. Three hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil and Irrigation Engineers.*

L. *Roads, Pavements and Parks.*—Surveys and locations; drainage and grades; foundations; selections and treatment of materials; maintenance of roads and pavements; design construction and maintenance of parks and parkways. Two hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil Engineers.*

M. *Steam Engines and Other Motors.*—Steam engines and their mechanisms; mechanical features and construction of condensing, compound and multiple expansion engines; engine valve gear; details of construction; erection and setting; piping; accessories; water, wind and wave motors; turbines. Two hours' credit, Junior year. Recitations and lectures. *Required of all Engineers.*

N. *Hydraulic Engineering.*—Continuation of course H. Collection and storage of water; analysis of hydrographic data with particular reference to Colorado and other western states; irrigation reports; organization and administration; pumps and pumping machinery; principles involved in the design of reservoirs, canals and structures. Two hours' credit, Senior year. *Required of Irrigation Engineers.*

O. *Design of Irrigation Structures.*—Practical application in the drawing room of the principles studied in the courses in Hydraulic Engineering, Resistance of Materials, and Masonry Structures to actual design work. Four hours' credit, Senior year. Study of plans of existing structures, conferences and design work. *Required of Irrigation Engineers.*

ELECTRICAL ENGINEERING

PROFESSOR SHEDD.

A. *Electro-magnetism.*—Discussion of electromagnets, the laws of magnetization by electric current, the magnetic circuit, design of direct-current dynamos.

B .*Generation and Transmission of Power.*—The transmission of different kinds of power. Transmission and distribution of electric power. Construction and operation of lines. A short general course.

C. *Alternating Currents.*—Theory of single-phase alternating currents. Design and construction of single-phase alternating-current dynamos and transformers. Polyphase currents.

D. *Testing Direct-Current Dynamos.*—Laboratory work with generators, motors and accessory appliances.

E. *Testing Alternating-Current Machinery.*—Testing alternating-current generators, motors, meters, transformers.

F. *Electric Railways.* Road-bed, electric circuits, and power plant.

G. *Electric Lighting.* More detailed study of construction and operation of lines. Illumination and photometry.

H. *Electricity in Mining and Quarrying.*—The practice in mining and quarrying where electric machinery can be advantageously applied.

I. *Electric Machinery.* A short course for students in mining, civil and irrigation engineering.

MECHANICAL DRAWING

MR. MOORE.

Students are expected to devote more time to drawing, in the Freshman and Sophomore years, than the number of hours assigned in the schedule, but may do the extra work at such hours as suit their convenience

Students in all engineering courses are expected to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

A. *Elements of Drawing.* This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right geometrical problems, cross-sections, shading with the right line and the bow-pen, conventional representations, mathematical curves, cycloidal and other motion curves, isometric, oblique and orthographic projections, working drawings, trac-

ings, the form and proportions of standard letters, both free-hand and ruled, methods of spacing and laying out titles.

B. *Descriptive Geometry* is required of all engineering students in the Freshman year. The work consists of recitations from text-books and the graphic solution of problems.

C. *Machine Design,* in the Sophomore year, includes recitations from text-books, the copying and tracing of machine drawings, drawing to scale from models and machine parts, working, detail and assembly drawings, laying out tooth-wheel gearings, and the making of original working drawings from specifications.

D. *Graphic Statics.*—This course includes the study of forces, stresses, couples and moments of inertia and is introductory to the later courses on Theory of Trusses. Recitations from text-books are followed by the application of the principles in the solution of practical problems in roof trusses, involving permanent and temporary loads, snow loads and wind pressures.

E. *Theory of Mechanism.*—A course for Juniors in Electrical Engineering, consisting of recitations on theoretical mechanism, motion and interaction of machine parts, mathematical problems in machine design, link motions, etc., with drawing of plates illustrating the practical application of the problems.

SHOP WORK

SUPERINTENDENT COLLAIS.

In the mechanical laboratories it is aimed to give students some knowledge of carpentry, wood turning, machinists' bench and vise work, iron lathe work, and blacksmithing. Practical talks on the work are given.

A. *Bench Work in Wood.* Students acquire a practical knowledge of the handling of tools and keeping them in order, and of executing models and joints in wood, that develop constructive principles in engineering work. *Required of all Engineers.* Fee, $4.

B. *Pattern Making.*—Patterns of parts of machinery are made, also cores, valves, valve stems, models in wood turning, pulleys, sheaves, etc. *Required of Electrical Engineers.* Fee, $4.

C. *Forging.*—Students acquire a practical knowledge of the handling and working of iron, mild steel and tool steel, and of the operation of bending, welding, forming, bolt-making, tempering and tool-making. *Required of all Engineers.* Fee $4.

D. *Work in Iron,* including bench-work, chipping and filing, accurate fitting and scraping, tool-finishing, thread-cutting by hand and machine, etc. Before the end of the course students jointly construct one or more machines. *Required of Electrical Engineers.* Fee, $4.

Department of Art

DELL HEIZER, DIRECTOR.

Instruction is offered in Academic Drawing, Painting, Illustration and Composition. Students without previous training devote their time to drawing with charcoal and pencil from the antique and still life, but from the first some work is done with colors. For more advanced students classes in portraiture, still-life painting and from the costume model, are held. The studios are open daily from 9 until 6 and students are encouraged to have independent sketching classes. The exhibition rooms and studios are in Perkins Fine Arts Hall.

TUITION.

HALF-DAY.		ALL DAY.	
Half-year	$30.00	Half-year	$50.00
One year	55.00	One year	90.00

TWO DAYS A WEEK.

Half-year	$25.00
One year	45.00

The Cutler Academy

Cutler Academy is named after the late Henry Cutler, of Massachusetts, a generous and steadfast friend of Colorado College. It is under the control of the Board of Trustees of the College. It provides a thorough preparation for any college in the United States. While the preparatory training is the principal aim, the plan of study is so arranged as to meet the requirements of students who do not propose entering upon college work. Classical and scientific courses are given, in each of which the work covers four years. Many of the advantages enjoyed by the students of

the College, of the Conservatory of Music and of the Department of Fine Arts, are shared by the pupils of the Academy.

Full information as to admission, courses, etc., is given in the Cutler Academy Bulletin, which will be sent on application.

Correspondence concerning the Cutler Academy should be addressed to the Principal, M. C. Gile.

LOCATION.

Colorado College is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Founded in 1871, under the direction of men of shrewd foresight and broad views, it has maintained from the beginning high standards of morality and culture. Saloons and the attendant destructive influences are absent. Radiating railroad systems and the recent development of neighboring gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers, but the invalids are so far outnumbered that the place has none of the depressing influence so often observed at noted health resorts. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous canons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the opportunity for outdoor exercise afforded by the great number of fine days and the dryness and rarity of the air, helpful in cases of malarial disease, asthma, and incipient phthisis. Students unable to work in other climates may here continue their studies while at the same time making a permanent gain in health.

COLLEGE BUILDINGS.

The buildings of the College are situated on a tract of about 50 acres, in the heart of the best residence portion of the city.

Cutler Hall (formerly Palmer Hall), the oldest building on the campus, was first occupied in 1880. It contains lecture rooms, and chemical, physical and biological laboratories. It is now entirely devoted to the use of Cutler Academy.

The Library, given in 1894 by the late Mr. N. P. Coburn, of Newton, Mass., and erected at a cost of $50,000, is of great architectural beauty and admirably adapted to its purpose. It is of the "Peach Blow" sandstone of Colorado, and its roof is of red tile with copper mountings. The interior, with its ceiling twenty-six feet high, its red oak woodwork, its picturesque galleries, its inviting alcoves, its great stone fire-places, is exceedingly attractive. Long arched windows extend from floor to ceiling. A full-sized cast of the "Winged Victory" of Samothrace stands at one end of the main hall. In recesses are marble busts of Antinous and Dante, and casts of the Hermes of Praxiteles and of Mercie's David. Mr. A. L. Dickerman's collection of rare and valuable Indian curiosities adds to the interest of the room.

The President's Residence, at the northern boundary of the campus, was purchased by the Trustees in 1888, and was remodeled in 1903.

The Astronomical Observatory is the gift of Henry R. Wolcott, Esq., of Denver, and was completed in 1894. Besides the dome room, it contains a lecture room, a transit room, and a photographic dark room.

The Gymnasium, built by the students of the College in 1891, contains a useful assortment of apparatus. See "Physical Training," p. 91.

The Perkins Fine Arts Hall, named for one of the principal donors, the late Willard B. Perkins, of Colorado Springs, was completed in 1900. It is a two-story stone building, erected at a cost of $30,000. The lower story is a large auditorium, seating 600, in which the chapel exercises are held and concerts and lectures are given. This room contains a valuable pipe organ, given by Miss Elizabeth Cheney, of Wellesley, Mass., in memory of her brother, Mr.

Charles P. Cheney. In the hallway stands a bronze statue of the Flying Mercury. The upper story contains the studios and lecture rooms of the Department of Fine Arts and the practice rooms for courses in Music. On the walls of the upper hall is a valuable collection of Japanese prints, presented by Mr. James F. Burns.

PALMER HALL, completed in the fall of 1903, at a cost of $280,000, contains the offices of administration and laboratories for scientific work in all departments. It is two hundred and eighty-seven feet long with a depth from north to south of ninety-five feet. Besides a sub-basement six feet high, there are three stories, a basement and a first and second floor. The style of architecture is that which has been chosen for the entire system of buildings eventually to occupy the College reservation, the first example of which was presented in the Coburn Library. The structure is fireproof, with steel frame and concrete floors, overlaid with terazzo finish. In the basement are laboratories for Chemistry, Physics and Psycho-physics, and a large demonstration room. On the first floor are to be found the offices of administration, general lecture rooms, and other laboratories for Chemistry and Physics. The second floor contains the laboratories and lecture rooms for Biology, Geology and Mineralogy, and a large, well-lighted Museum for the natural science collections of the College. The building was equipped at a cost of $50,000.

On the walls of the room devoted to the use of the Trustees and Faculty are hung a few choice paintings, which, it is hoped, are the nucleus of a large collection—Mr. Leslie J. Skelton's "Meadow-land, Montigny, France," a picture by Iwill, and two paintings by Mr. Harvey Young, "Crystal Lake, California," and "La Sal Mountains."

COLLEGE RESIDENCES.

HAGERMAN HALL is a substantial stone building, built in 1889, and used as a home for young men. Besides the students' rooms, which are well lighted and attractive, it contains a dining room, accommodating one hundred and fifty persons, now used by a young men's boarding club, and the Y. M. C. A. reading room. On the roof are some of the instruments of the Meteorological Station, and these are connected by a subterranean cable with the electric registering apparatus in the Observatory.

Montgomery Hall was erected and furnished in 1891 by the Woman's Educational Society, and presented free of debt to the College. It provides a comfortable home for young women. Its dining room is now used by a young women's boarding club.

Ticknor Hall, the generous and beautiful gift of Miss Elizabeth Cheney, was opened as a home for the young women of the College in January, 1898. Its comfort and conveniences are the result of careful study of the most recently-built dormitories for women. Besides students' rooms, it contains the College dining-room, drawing-rooms, and guest-rooms, and a study-room, comfortably furnished and provided with reference books, for the use of all young women of the College, and an infirmary capable of complete isolation. The infirmary is open to all young women living on the campus, and is in charge of a trained nurse, whose services, whether in the infirmary or in the students' rooms, are paid for by an annual fee of $5.00 from each young woman. This fee is due in September.

McGregor Hall, a commodious and convenient building, was opened in September, 1903, for use as a third residence for young women.

No young woman will be received into the halls who is less than sixteen years of age, and who is not taking at least fifteen hours' work or its equivalent. After all vacancies in the halls are filled, suitable rooms in the vicinity may be secured subject to the approval of the Dean of Women.

All the foregoing College buildings, except the Gymnasium, are of stone. Heat and electric light are furnished to all from a central plant.

PHYSICAL TRAINING.

The open climate of Colorado Springs makes outdoor sports possible and attractive throughout the year. Tennis is played all winter, track and baseball practice is begun as soon as the football season is over. The young men and the young women have separate gymnasia, heated by steam and furnished with shower baths, lockers, etc.

Football, baseball, basketball and track athletics are managed

by the Colorado College Athletic Association. The interests of the Association are controlled by a Board, consisting of Professor H. A. Ruger, from the faculty, Messrs. W. R. Armstrong and Hildreth Frost from the alumni, and Messrs. L. C. Bale, Orrin Randolph, and Charles Leuchtenburg from the students. Mr. Willis R. Armstrong is President of the Board.

In 1898 the Athletic Association laid out, at large expense, the Washburn Athletic Field, named in honor of the Rev. Philip

Physical Training for the young women is in charge of Miss Mary Helen Woodsmall. All students are required to take this work. Special exercises are planned for those whose health does not permit them to enter the general classes.

Dark blue suits and gymnasium slippers are required. Opportunity is given for out-of-door work consisting of tennis basket and tether ball, and field hockey.

MANLY D. ORMES, LIBRARIAN.

The Library building has been elsewhere described (see p. 89). In it are about thirty-two thousand volumes and as many pamphlets. The leading literary and scientific journals are received, as are also the United States Government publications and those of the State of Colorado. Of United States documents the library now has about five thousand volumes, including the records of Congress complete from 1847, and many valuable records for the period 1774-1837. These documents are arranged on the plan adopted in the library of the Superintendent of the United States Documents at Washington.

The Medical Alcove was originated in 1894, when the late Dr. B. F. D. Adams, of Colorado Springs, presented to the College his extensive medical library. The El Paso Medical Society contributes the transactions of Medical Societies and standard works purchased by the Society. In 1896 the collection was enlarged by the gift of

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In 1898 the Athletic Association laid out, at large expense, the Washburn Athletic Field, named in honor of the Rev. Philip Washburn. For this purpose, the natural amphitheatre in the rear of the College buildings, facing the mountains, was used. About five acres of ground were leveled and a grand stand, seating 600, was erected. In 1900 a grand stand, seating 800, was given by Mr. J. F. Burns. In 1904 a gift of $1,000 from Mr. Charles Washburn, in memory of his brother, together with a gift from General Palmer, made many further improvements possible. The field has been enlarged to contain two football fields, two baseball diamonds, a quarter-mile cinder track, and a two hundred and twenty yard straight-away track. For adaptation to its purposes, there is no more complete and satisfactory college athletic field in the West.

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two hundred and fifty volumes and three hundred pamphlets from the late Dr. E. C. Kimball, of Colorado Springs, and again in 1904 by the gift of two hundred and five volumes from the library of Dr. James A. Hart, also of Colorado Springs.

The Coburn Library Book Club, organized in 1897, provides its members with the best new books, which are given to the Library after twelve months. The fee is $5 a year or $3 for six months. Members enjoy the full privileges of the Library. The Club has purchased about two thousand books, of which nearly eighteen hundred have been given to the general Library. The College Women's Club has recently given the nucleus of a collection of books on pottery. The Wednesday Art Club and the local Chapter of The Daughters of the American Revolution have also started collections of books on their special topics. In the Library building is a reading room, where the current literary and scientific magazines, as well as a number of leading newspapers, may be consulted.

In 1904 the Engineering Department of the Library was installed in the basement in a room prepared for the use of the Pike's Peak Polytechnic Society. In addition to the one thousand volumes belonging to the College, there are some valuable private libraries on the shelves loaned by members of the club, to which students of the Engineering Department have access.

In room 44 of Palmer Hall are about 300 volumes which form the beginning of a department library for Greek and Latin. These books have been given to the Classical Department by Mrs. M. C. Gile.

LABORATORIES AND APPARATUS.

BIOLOGY.

The Biological Laboratories consist of eight thoroughly-lighted and convenient rooms on the second floor of Palmer Hall. In these each student is assigned a desk and in courses requiring microscopic observation, is furnished with a microscope for which he is held responsible. There is an abundant supply of all kinds of glassware necessary for the various courses, also micrometer-eye-pieces, cameras, dissecting microscopes, paraffine bath, microtomes (Reichert's and Minot's), life-boxes and charts. For the courses in Zoolo-

gy, Comparative Anatomy, etc., a number of mounted and disarticulated skeletons and anatomical models are provided. A large amount of the museum material is also available for illustration in these courses. The physiological laboratory is supplied with such Harvard apparatus as the capillary electrometer, rheochord, inductoriums, kymographs, moist chambers, muscle warmer, heavy muscle-lever, ergograph, and a number of smaller pieces. In addition there are on hand such pieces as Kronecher's mercury cup metronome, Ludwig's arm support and sphygmograph, Marey's cardiograph, stethoscope, Erlanger's sphygmomanometer for blood-pressure determinations, Thoma-Zeiss hæmacytometers for the enumeration of the corpuscles of the blood, and Fleischl's hæmometer for the estimation of the hæmoglobin of the blood. The equipment for Bacteriology includes an incubator, Arnold steam sterilizer, autoclav, hot-air sterilizer, Becker balance, Trœmner media scale, centrifuge, inoculating water baths, double boilers, hot-water funnels, counting apparatus (Esmarch's and Wolffhuegel's) and other appliances essential to the work. For botanical courses a clinostat, auxinometer and a variety of smaller apparatus are provided.

The Herbarium occupies a room in the Biological Department. The nucleus of the collection consists of a herbarium of Colorado plants purchased from Marcus E. Jones. The larger part of the present herbarium is the Edward Tatnall herbarium, which was presented to the College by Miss M. H. Tatnall, of Elmira, N. Y. This collection, of about 22,000 species and varieties, includes representatives of all the great plant groups. Of these there are some 900 Algæ, 1,700 Lichens, 2,000 Bryophytes, 1,050 Pteridophytes, and the remainder, Angiosperms. These specimens, which are carefully and fully labeled, were collected in 23 different states, Canada, Sweden and England, by 65 collectors. A catalogue of these has been prepared, thus making the herbarium especially valuable.

PHYSICS.

The Sophomore Laboratory contains, among other apparatus, a large standard clock equipped with a special magnetic contact-maker, a standard H. J. Green barometer presented by General William J. Palmer, a large Gœrtner cathetometer, ballistic pendulum, Borda pendulum, Kater pendulum, chronograph, apparatus for determining moduli of elasticity, an air thermometer, apparatus for determining vapor density and apparatus for determinating vis-

cosity of oils. A number of pieces of apparatus have been made by Mr. E. J. Hoff, of Colorado Springs, from original designs furnished by the College. The Photometer room is furnished with a three-meter photometer track, Lummer-Brodhun screen, and revolving apparatus for the photometric measurement of light sources.

The Electrical Laboratory is equipped for the Junior and Senior experiments. A distribution switch-board in this room furnishes electrical connections with all parts of the Department. This laboratory is also used for the Junior work in the Electrical Engineering course. Some of the latest types of electrical apparatus are included in its equipment. Mention may be made of the following: A standard potentiometer, a Carey-Foster bridge, and Hopkinson Permeameter from the Willyoung and Gibson Company, a Bose Magnetic Balance, Induction Bridge, a Beggerow Electrometer from the Siemens and Halske Company; from the Hartmann and Braun Company a sensitive moving coil galvanometer, a standard of self-induction and a permeameter testing set complete; from the Cambridge (England) Scientific Company a students' magnetometer and a resistance thermometer. Of the above items the last eight were secured from the exhibits at the St. Louis Exposition.

There are smaller laboratories for Junior and Senior experiments in Optics and Heat, and a photographic developing room.

The Lecture Room is furnished with projection apparatus for transparent slides and for opaque objects such as photographs, mechanical drawings and models.

The Apparatus Room contains the apparatus for demonstration work and that not in immediate use. Mention may be made of a large static machine presented by the Alumni Association of Colorado College, a Tesla X-Ray Coil presented by Dr. Gerald B. Webb, of Colorado Springs; a large Michelson Interferometer and a Fluess Air-Pump.

GEOLOGY.

The rooms occupied by the Department of Geology, five in number, consist of a general lecture room and laboratory, mineralogical and paleontological laboratories, a departmental library and a photographic dark room. The general laboratory is provided with five large models and relief maps for the illustration of river work, glaciation, and vulcanism, together with a complete set of the geological maps of the United States Geological Survey and nearly

500 topographic maps. Suites of rock specimens are provided, covering all the main types of the igneous, sedimentary and metamorphic rocks, as well as representative specimens from important mining districts in Colorado. A carefully prepared collection of thin sections of rocks is available for microscopic study, covering the varieties of the igneous rocks fully and illustrating their mineralogy. One Seibert petrographic microscope of the 1904 model is provided for every two students.

In the mineralogical laboratory a general collection, numbering several specimens for each of the 175 minerals taught in the introductory course, is set out in open cases for the illustration of the crystal forms and the variations in the massive kinds. Each student is given a working collection covering the same minerals. Crystallography is taught by means of 150 models of crystals in wood and by the aid of a small collection of transparent models. The material for the practice determinations required of every student embraces 3,000 specimens.

For the work in paleontology the collections of fossils in the College museum are employed. They are representative for a large number of the genera in the several classes of invertebrates.

The departmental library contains complete sets of the publications of the United States Geological Survey, Annual Reports, Monographs, Bulletins and Professional Papers with about 150 of the annual volumes issued by the state surveys, and general works of reference.

CHEMISTRY.

The Chemical Laboratories include: (1) The General Laboratory; (2) the Qualitative Laboratory; (3) the Quantitative and Electro-Chemical Laboratory; (4) the Organic Laboratory; (5) the Assay Laboratory. In all of these apartments the best features of modern arrangement and construction have been embodied. The lighting and ventilation have received especial care. The hoods are generously distributed in every working room, and each hood is connected with a large separate flue. The ceilings are high, the light excellent, the desk and working space for each student is abundant and the drainage through iron covered floor drains is of the most approved modern type. The desks are provided with combination locks and fitted with very full sets of reagents and all facilities for the prosecution of the work in hand. Adjacent to the laboratories

are the preparation rooms, which provide for the ready distribution of supplies. The smaller rooms which are used for particular branches of chemical study, are supplied with the appropriate means of work, fine balances, spectroscope, the best Schmidt and Hænsch polariscope, photographic apparatus, combustion furnaces and a large assortment of metal and glass apparatus for general and analytical processes of investigation.

OBSERVATORY.

The Observatory has a telescope of four-inch aperture, presented by Mr. Henry R. Wolcott, of Denver, a transit and a sidereal clock, both given by Mr. Charles S. Blackman, of Montreal, Canada, and several of the instruments of the College Meteorological Station. The largest of these instruments, the quadruple register, donated by General Palmer, records minute by minute the direction and velocity of the wind and the sunshine and rainfall, by means of electric connection with instruments on the Observatory and on Hagerman Hall. In shelters are instruments for measuring and recording temperature and humidity. A Draper barograph, given by Dr. S. E. Solly, affords a continuous record of the atmospheric pressure. The Observatory owns bound records of observations and instrumental registers of previous years, together with the beginnings of a meteorological library.

There is also available for instruction an apparatus for stellar photography belonging to the Observatory of Harvard College. This is the first fixed plant of the kind in Colorado. It is situated on Nob Hill, about two miles from the College grounds, in charge of the Director of the Observatory.

Aside from the value of the new apparatus for purposes of instruction and of scientific investigation, it has increased the ability of the Observatory to render assistance to practical interests. Special information has been furnished on request to the city engineer and to several railway companies, while tabulated statements of the current weather are supplied regularly to the local newspapers, to the city health officer, and, through the Chamber of Commerce, to various applicants at home and abroad, who desire them for publication. Full statistical records are issued semi-annually, as numbers of Colorado College Studies.

THE WESTERN ASSOCIATION FOR STELLAR PHOTOGRAPHY.

Colorado College, in common with other educational institutions of the State, is interested in the success of the Western Association for Stellar Photography, an organization which was incorporated October 24, 1904, for the promotion of astronomical science by the use of photographic methods. The officers are: President, Edward C. Pickering, Director of Harvard College Observatory; Vice-President, Herbert A. Howe, Director of the Chamberlin Observatory, Denver; Secretary and Treasurer, Frank H. Loud, Colorado College.

An instrument of small aperture, but of excellent definition and accurate mounting, is in operation on Nob Hill, about two miles east of the College grounds, and is yielding good results, some of which it is expected will be available in the form of charts for purposes of instruction.

It is found that the transparent air of Colorado is eminently suitable for this species of investigation, and a course including practical work with this instrument is, through the co-operation of the Harvard College Observatory, offered to students of the college.

MUSEUM.

LESTER C. HIMEBAUGH, CURATOR.

The Museum is on the second floor of Palmer Hall in a well-lighted room 116 feet long by 42 feet wide. Glass showcases extend on all sides of the room. The central part is taken up with the larger specimens. The megatherium and a restoration of the mammoth occupy the west half and the mounted skeleton of a whale occupies the eastern portion. Grouped around them are the the large natural history specimens, casts of noted fossils, and at intervals are showcases for small specimens.

The foundation of the Museum was laid by the gifts of Prof. J. H. Kerr, the Rev. E. N. Bartlett, Dr. E. P. Tenney and Mr. George Fowler.

Paleobotany is represented by two cases of Carboniferous, Cretaceous, and Oligocene plant remains classified by Mr. Baker.

Paleontological Department.—Several cases are given up to the display of the invertebrate fossils, which are zoologically arranged. The collection contains typical and rare forms of foraminifera, corals, crinoids, brachiopods, mollusca and arthropoda. The mollusca and echinoderms collected by Prof. Cragin are for the most part from the lower Cretaceous. The mollusca for the Atlantic slope, presented by Prof. Wm. B. Clark, of Johns Hopkins University, are chiefly Tertiary. Besides an excellent geological record, the collection contains a series of casts of noted specimens.

The foundation for the collection in vertebrate paleontology was laid by the purchase for the College of the large paleontological cabinet of Prof. Cragin by General Wm. J. Palmer and the Colorado Springs Company. This collection consists of some 8,000 specimens from Colorado, Kansas, Indian Territory, Texas, and other states, and includes remains of Pliocene horses, llamas, Miocene rhinoceroses and mastodons, Cretaceous saurians, and Tertiary fishes. It is of importance not only as supplying a large part of the geological record not otherwise represented in the Museum, but also as containing the types of many new species and some new genera of fossils. Among these type fossils the most important is the large plesiosaurian reptile *Trinacromerum,* the type of a new genus and species described from the Cretaceous of Kansas in 1888. Another valuable item of the collection is the extensive series of casts of fossil vertebrates given by W. S. Stratton. These casts include such forms as the Ichthyosaurus, Archæopteryx, Glyptodon, Dinotherium head, Elephas head, Mastodon head and tusks, Megatherium, and a restoration of Colossochelys, Plesiosaurus, Mammoth and other forms.

Natural History.—Collections in invertebrate zoology occupy several showcases and include cœlenterata, echinodermata, mollusca, and common and rare forms of foraminifera.

Vertebrates are well represented by the large natural history collection received through the generosity of W. S. Stratton. It contains 29 species of fishes, among which are the blue-shark, a few ganoids, and several curious tropical forms. Among the 23 species of reptiles the most important are the Indian crocodile, python, iguana and the gila monster. The collection contains 365 species of

birds, including such interesting forms as the Australian crane, apteryx. The ornothology of all parts of the world is represented by the more conspicuous and striking forms. The mammals number 170 and include a group of mounted orang-utans, a group of all known genera of marsupials, the Indian elephant, rhinoceros, nylghau, polar bear, and a complete mounted skeleton of a large whale.

Mineralogy.—The collection in mineralogy occupies the north side of the room and includes 1,450 specimens of minerals, common, commercial, and rare.

Ethnology is represented by a series of casts of brains of animals and skulls and brains of different peoples. The series also contains 125 masks of South Sea Islanders and 25 framed pictures of different races.

Anthropology. — The anthropological department contains a large amount of pottery from Missouri, New Mexico and Peru; the Taos pueblo, Pueblo Bonito, and DeChelly ruins are reproduced in miniature. The Bixby-Lang and Deane collections from the cliff-dwellers were received through General William J. Palmer.

The Bixby-Lang collection was made in Southeastern Utah and Northern Arizona during the years 1897-98. The collection includes almost 500 specimens of pottery, implements, skulls and mummies. The specimens of pottery are exceptionally well preserved. The Deane collection was made in Western New Mexico and includes over 800 specimens of pottery, implements, skulls and idols.

There is also a collection of Egyptian relics received from the Egyptian Exploration Society, of which Colorado College is a member.

The Museum contains over 16,000 labeled specimens and about 5,000 more specimens are stored. The work of making a card catalogue is now under way.

RELIGIOUS LIFE.

The College is distinctly Christian, and recognizes Christian character as the highest attainment. It is unsectarian in its management. Inquiry is made of the students at entrance, as to their denominational affiliations, and what churches in the city they desire

to attend; lists are sent to the pastors of these churches, who seek out the students and bring about them the influence of church homes. Morning prayer is held in the chapel daily, attendance upon which is required of all students. Occasionally the service is shortened for the President's addresses, in which he discusses questions bearing directly on student life.

Occasional Sunday Vesper services are held in the chapel, conducted by clergymen of various denominations. The Day of Prayer for Colleges is marked by appropriate observance. Weekly prayer meetings on Sunday afternoons and Friday evenings are in charge of the student organizations.

The Young Men's and the Young Women's Christian Associations are represented by strong branches, under the auspices of which are conducted mission work at home and abroad, and classes for Bible study. These Associations send delegates to all the state and national conferences. The Student Volunteer movement is also represented. Of the former members of the band, some are continuing in other institutions their preparation for the foreign field, and others are already actively engaged in missionary work.

At the beginning of the College year members of the Associations meet all trains and welcome new students.

STUDENT PUBLICATIONS.

The *Tiger,* a weekly newspaper, is issued by an editorial board composed of College students. An *Annual* is published in May by the Junior class. A *Handbook* of information is issued at the beginning of the College year by the Y. M. C. A.

LITERARY SOCIETIES.

The Apollonian Club and the Pearsons Literary Society, composed of young men, and the Minerva Society, the Contemporary Club and the Hypatia Society, composed of young women, hold weekly meetings for debate and other literary work.

ORATORICAL AND DEBATING CONTESTS.

The Oratorical and Debating Association, of which all students are members, has charge of contests in public speaking. Four contests are held each year as follows:

The Freshman-Sophomore prize contest in declamation is held early in December. Four speakers from each class compete. The first prize is $15; the second, $10.

The State Oratorical Contest between Colorado College, Denver University, The University of Colorado and the Colorado Agricultural College, is held on the third Friday in February. The preliminary contest at Colorado College is held a month before that time. A first prize of $25 and a second of $15 are awarded in the final contest.

The Intercollegiate Debate with the University of Utah is held in April.

The Memorial Day Contest in Oratory between the men's literary societies is held on the 30th of May.

Besides these events there is an annual public debate between representatives of the Apollonian and Pearsons Societies.

PHI BETA KAPPA.

A charter of the Phi Beta Kappa Society was granted to Colorado College in September of 1904. The object of the Society is the promotion of scholarship and friendship among students and graduates of American colleges. The members of the Society are elected primarily from the best scholars of the graduating classes of the College; secondly from the graduates of the College whose post-graduate work entitles them to such honor; and lastly from any persons distinguished in letters, science, or education. In addition to scholarship, good moral character is required as a qualification of membership.

One-seventh of the regular members of each graduating class in the collegiate department of Colorado College shall be eligible to election to the Phi Beta Kappa Society at the end of the first half of the Senior year; provided, however, that no student

shall be eligible who does not take his Junior and Senior years in Colorado College, or who has not received a grade-mark of ninety out of a possible one hundred in at least one-half of his college work.

THE GLEE CLUB.

The College Glee Club is in its eighth year and is under the direction of Mr. Clarence W. Bowers, of the Musical Faculty. The Club this year presented a burlesque comic opera on Rip Van Winkle. Under the name of the Footlights Club it gave concerts at Louisville, LaFayette, Berthoud, Windsor, Greeley, Fort Morgan, Brush, Sterling, Cheyenne, Brighton and Colorado Springs.

COLORADO COLLEGE SCIENTIFIC SOCIETY.

The Colorado College Scientific Society was organized in 1890. Its objects are: "The discussion of recent scientific results, the promotion among its members of scientific inquiry and investigation, and the publication of the more important papers read at the meetings." Ten annual publications, entitled "Colorado College Studies," have been issued by the society, and a large number of exchanges have been secured from associations of a like nature, including several foreign societies. During the past year the publication of the "Studies" has been given over to the college. These are now issued bi-monthly. The following scientific papers have appeared in them during the current college year:

"Summary of Meteorological Observations, January to June, 1904."—Professor F. H. Loud.

"Determination of Number of Hours of Possible Sunshine in Colorado Springs."—Professor F. H. Loud.

"Notes on Multiple Lightning Flashes."—Mr. F. C. Jordan.

"Plant and Animal Ferments and Their Relation to Life."—Professor E. C. Schneider.

"The Elastic Modulus and Elastic Limit of Rubber in Their

Relation to Change of Temperature."—Professor J. C. Shedd and Leonard R. Ingersoll.

"The Use of the Interferometer in the Study of the Zeeman Effect."—Professor J. C. Shedd.

The Secretary of the Society, to whom all correspondence, exchanges, etc., should be addressed, is Dr. Florian Cajori.

OFFICERS OF THE ALUMNI ASSOCIATION.

O. R. Gillett, '98	President
Ella Taylor, '97	Vice-President
Jeannette R. E. Scholz, '03	Secretary
Florence Leidigh, '02	Treasurer

COLLEGE LECTURE COURSE.

Since 1894 courses of lectures and single addresses have been given in Colorado Springs and other cities in the State. It is the purpose of the College to expand this work, as facilities and opportunities increase.

The following lectures are among those that form the programme for 1904-1905:

Professor E. S. Parsons:
"The Isle of Wight."
"A Swiss University Town."
"Oxford" (two lectures).

President Stone of the Colorado Forestry Association:
"Forestry."

Dr. Strickler:
"The Relation of Genius to Insanity."

Dr. John Inglis:
"On the Boxer Movement in China."

Professor G. I. Finlay:
"The Geology of the Pike's Peak Region" (five lectures).

Professor Fred Crabtree:
"On the Composition and Uses of Coal."

Mr. Frederic R. Hastings:
"Thomas Carlyle and the Philosophy of His Life."
"Emerson and the Secret of His Power."

Professor E. C. Hills:
"Spanish Literature."

Professor Louis A. E. Ahlers:
"The Drama of Ibsen."
"Poetic Realism."

Professor Urdahl:
"The Recent Trust Movement in Europe."

EXPENSES.

Tuition by the year	$35.00
Matriculation fee	5.00
Library fee	3.00

(From the above named fees there is no rebate in case of withdrawal).

Board in Montgomery Hall (club for young women), a week.	2.50
Board in Hagerman Hall (club for young men), a week	3.00
Board in Ticknor Hall (college table), a week	4.00
Rooms warmed, furnished and lighted, by the year, for each occupant	$40.00 to 80.00

The number of rooms under $80 is limited. Application should be made early. Rooms are rented by the year, and will be retained for incoming students only when the application is accompanied by a deposit of $5. This fee will be credited on the bills for room rent, and will be refunded only in case the room is given up by September first.

Students who room in the College residences are required to furnich towels, bed linen and blankets.

Fees of the College physician:

Office consultation	$ 50
Visits to rooms	1.00

For prolonged illness and in case of contagious disease, a special nurse is employed, and the expenses are charged to the patient.

COLLEGE BILLS.

The bills for tuition and room rent are issued at the beginning of each half-year, and are payable immediately. Students who withdraw before the end of the term pay full tuition. Students who withdraw less than six weeks before the end of the term pay full room rent. Board bills are payable monthly, in advance, and no rebate is made for absence of less than a week.

SCHOLARSHIPS.

The income of the following scholarships is devoted to the aid of worthy students who may need assistance in completing their course, and who, by their scholarship and character, prove themselves worthy of such assistance.

The Thomas Davee Scholarship of $500, established by the late Mrs. T. V. D. Mitchell, of West Minot, Maine.

The Rice Scholarship of $700, established by friends of the Rev. Chas. B. Rice, D. D., of Danvers, Mass.

The Currier Scholarship of $1,000, founded by the late Hon. Warren Currier, of St. Louis, Mo.

The Edwards Scholarship of $500, given by the Congregational Church of Wellesley Hill, Mass.

The Mary Caroline Quincy Scholarship of $500, given by the late George Henry Quincy, of Boston, Mass.

The Lawrence Myers Scholarship of $1,000, and the Lucy Platt Myers Scholarship of $1,000, given by Mrs. Lætitia M. Myers, of Plainfield, New Jersey.

The Fay Scholarship of $1,000, founded by the late Eliza A. Fay, of Boston, Mass.

A Scholarship of $1,000, given by Mr. William F. Richards, of Newport, N. H., through the Woman's Educational Society of Colorado College.

The Willard B. Perkins Scholarship of $7,000. The second Willard B. Perkins Scholarship of $7,000. These two scholarships were given by the late Willard B. Perkins, of Colorado Springs.

The Hawley Scholarship Fund of the Woman's Educational Society, now amounting to about $10,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships of such young women of the College as the Faculty may recommend, preference being given to daughters of home and foreign missionaries. This year six scholarships are offered from this fund.

The Hawley Scholarship Fund of Colorado College, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships for such students of the College as the Faculty may recommend who may be fitting themselves for distinctively Christian work.

The Hawley Memorial Fund, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., in memory of her husband, Mr. Martin Hawley, the annual income of which is loaned to "worthy and deserving students of the College, as the Faculty may see proper."

The Strettell Memorial Fund of $2,000, given by Mrs Alma G. V. Harrison, of London, England, and General William J. Palmer, of Colorado Springs, in memory of Mr. Arthur E. V. Strettell, Mrs. Harrison's brother, who died in Colorado Springs in 1882. The income of this fund is to be used to aid students suffering from lung troubles.

The Mary G. Slocum Scholarship of $100 a year, given by the Woman's Educational Society of Colorado College. This scholarship is awarded on the basis of competition to young men of the Junior Class.

The C. C. Hemming Scholarship of $225 a year, given by Mr. C. C. Hemming, of Colorado Springs, is open for competition to the young men of the Junior Class of the College of Liberal Arts. The award is made on the basis of scholarship, character and general fitness. The recipient shall have been for two years a regular student in the College, shall return for his Senior year, and shall have expressed his determination to graduate. The holder of the Perkins Scholarship shall not be eligible.

The Ruth Dayton Scholarship of $1,000, established by Mrs. Emma Danforth Wiley, of Colorado Springs.

Several other scholarships are supported by annual subscription.

SELF-SUPPORT.—Advanced students of high standing have occasional opportunities for private teaching. Capable and faithful young men can often find work in town. A limited amount of service in Montgomery and Ticknor Halls is offered to young women. This is not often available for first-year students.

PRIZES.

The Hastings Prizes.—The sum of $1,000 has been given by Mr. Frederic R. Hastings, of Colorado Springs, the income of which is to be used in providing prizes for sufficiently creditable theses produced by students in the course, Philosophy K.

THE COLORADO COLLEGE PARK ASSOCIATION.

During the last three years the Colorado College Park Association has expended about $10,000 in parking the campus. General William J. Palmer has provided for the maintenance of the park for five years by an annual contribution of $1,000.

THE WOMAN'S EDUCATIONAL SOCIETY.

This Society was formed in April, 1889, by the women of Colorado Springs. Its purpose, as expressed in its constitution, "is to give physical, intellectual and spiritual aid to students in any department of Colorado College." This Society built Montgomery Hall, furnished Ticknor and McGregor Halls, and has been of service in many ways to the College. Its members endeavor to come into personal relations with the students, especially with those who are supporting themselves; they try to find work for them and by friendly advice assist them in their efforts to secure an education. Loans are made on the following conditions:

First—Loans may be made to students who have been in the College for one term and are recommended by the Faculty as in every way deserving of such aid.

Second—No student shall be allowed to incur an indebtedness to the Society of more than $300.

Third—Students may receive loans without interest until their connection with the College ceases; after that time their notes shall draw interest at 4 per cent.

For the scholarships within the gift of the Society see pp. 106, 107.

The officers for the current year are:

President—Mrs. William F. Slocum.

First Vice-President—Mrs. John R. Hanna.

Second Vice-President—Mrs. Francis W. Goddard.

Third Vice-President—Mrs. L. A. E. Ahlers.

Recording Secretary—Mrs W. E. Fette.

Corresponding Secretary—Mrs. Edward S. Parsons.

Treasurer—Mrs. Florian Cajori.

Auditor—Miss Priscilla Sater.

HOSPITAL FUND.

The Trustees of the Bellevue Sanitarium have given to the College nearly $4,000 as the nucleus of a hospital fund for the students.

THE NEEDS OF THE COLLEGE.

Colorado College, never more truly than today, has great and pressing needs. Its growth during the last fifteen years has been steady and rapid and its friends have generously assisted in helping it meet its constantly enlarging opportunity. But, while buildings have been provided fairly commensurate with the practical needs of the college work, in other directions the College has entirely out-

grown its resources. If it is to do the work which legitimately belongs to it and have its part in meeting the educational demands of the great section of country in which it is located, if it is to provide a thorough and broad training under positive Christian influences for those who are coming to it in constantly increasing numbers, not only from Colorado, but from the entire country, it must have in the immediate future larger resources than those upon which it has had to rely during the last few years.

Among the pressing needs are the following:

General Endowment.—For the last ten years the College has been doing a work equal in amount and quality to that done by older eastern institutions possessing three or four times its endowment funds. In consequence each year a deficit has had to be faced which only the continued generosity of many friends has prevented from becoming disastrous. At present a movement is under way to secure an additional $500,000 for the endowment fund. This is needed to pay the actual present running expenses of the College. A much larger sum must be provided if the College is to go forward to fill its larger place in the educational life of the country.

It is hoped that one form in which this large endowment will be bestowed is in the provision of permanent funds for individual professorships.

Funds for the Library.—The library has only a few hundred dollars of permanent funds. It must rely for increase upon gifts and upon purchases made out of current expense funds to meet the absolute requirement of the different departments. There is an imperative need first for money to be used at once in the filling of gaps in the material the library already possesses, and also for permanent funds from which additions may be regularly made in accordance with the varied intellectual needs of the College.

Special Funds for Scientific Research.—Money to be devoted to scientific work in special lines is very greatly needed. The opportunities of Colorado College in this direction are unusual, because of the geographical, meteorological and geological situation. The attention of those interested in the advancement of science is earnestly called to this fact.

Funds for the Engineering School.—This department of the College needs a considerable sum of money to be immediately expended in the proper development of its work and also a large endowment fund to secure its stability and future growth. Large gifts bestowed for these ends will directly aid in the development of the rich resources of Colorado and the adjoining mountain states.

Residence Hall.—It is hoped that the young men may soon be provided with another residence hall, as the need is most pressing.

Scholarships.—The Trustees desire to emphasize the fact that many young people in a new country are obliged to earn their education by hard and self-denying work. Colorado College still needs a large addition to her scholarship funds. Money thus applied tends directly to the profit of the individual and of the country.

Fellowships.—It would be of great value in developing higher standards of scholarship if several graduate fellowships in various departments could be established.

Infirmary.—The Infirmary in Ticknor Hall, which is available for young women only, is inadequate for the growing needs of the College. There should be provided a separate building, in which contagious diseases can be cared for, as well as ordinary cases of illness. During the past year a fund has been started for the endowment of a cot to provide for illness among students who are working their way. Additions to this fund are an urgent need.

FORMS OF BEQUEST.

Those who intend to devise property to Colorado College, or to the Woman's Educational Society, are requested to employ one of the following Forms of Bequest:

"I hereby give, devise and bequeath unto The Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

"I hereby give, devise and bequeath unto the Woman's Educational Society of Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

If property other than money is willed, the form should be correspondingly varied.

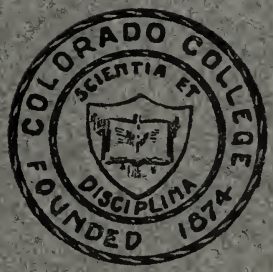
TELEGRAPH JOB PRINT
COLORADO SPRINGS

Colorado College Publication

THE LIBRARY

Bulletin Series 32 General Series 21

BULLETIN
1906



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Bulletin Series, No. 32 General Series, No. 21

THIRTY-SECOND ANNUAL BULLETIN

OF

COLORADO COLLEGE

COLORADO SPRINGS, COLORADO
1906

THE NATIONAL LIBRARY

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Calendar

1906.

Mar. 27—Last day for registering for Hawley and Mary G. Slocum scholarships.....Tuesday
Mar. 28—**Spring Recess begins** at 1 p. m .....Wednesday
April 5—**Spring Recess ends** at 8:15 a. m.....Thursday
April 13—Good Friday: a holiday .....Friday
May 30—Memorial Day: a holiday.....Wednesday
May 31—Examinations begin..... Thursday
June 10—Baccalaureate Sermon .....Sunday
June 11—Class Day .....Monday
June 13—**Commencement** ..... Wednesday
Sept. 11—Residence Halls open .....Tuesday
Sept. 11—Condition Examinations begin at 2 p. m.....Tuesday
Sept. 12—**First Half-Year begins** at 8:15 a. m.....Wednesday
Nov. 6—Election Day: a holiday .....Tuesday
Nov. 14—Insignia Day .....Wednesday
Nov. 29—Thanksgiving Day: a holiday .....Thursday
Dec. 21—**Christmas Recess begins** at 5 p. m .....Friday

1907.

Jan. 8—**Christmas Recess ends** at 8:15 a. m.....Tuesday
Jan. 21—Mid-year Examinations begin.....Monday
Jan. 25—Trustees' Day .....Friday
Jan. 28—**Second Half-Year begins** at 8:15 a. m. .....Monday
Feb. 10—Day of Prayer for Colleges.....Sunday
Feb. 22—Washington's Birthday: a holiday.....Friday
Mar. 26—Last day for registering for Hawley and Mary G. Slocum scholarships .....Tuesday
Mar. 27—**Spring Recess Begins** at 1 p. m. .....Wednesday
April 4—**Spring Recess ends** at 8:15 a. m.....Thursday
May 30—Memorial Day: a holiday .....Thursday
May 31—Examinations begin .....Friday
June 9—Baccalaureate Sermon .....Sunday
June 10—Class Day .....Monday
June 12—**Commencement**..... Wednesday

Historical Statement

Colorado College is the oldest institution of higher education in the State. In 1874, while Colorado was yet a territory, a College upon a broad Christian foundation was established in Colorado Springs. The authorized announcement for that year contains the following:

"It is the purpose of the Trustees to build a College in which liberal studies may be pursued under positive Christian influences. . . . The College is under no ecclesiastical or political control. Members of different churches are on its Board of Trustees. . . . The character which is most desired for this College is that of thorough scholarship and fervent piety, each assisting the other, and neither ever offered as a compensation for the defects of the other."

From the beginning the Board of Trustees has been composed of leading professional and business men of Colorado, together with a few Eastern men of similar standing, and has ever been animated by the purpose avowed by the original Board.

A grant of land had been made in advance of the organization of the College, in 1873, by the Colorado Springs Company, the founders of the City of Colorado Springs. The Rev. Jonathan Edwards was the first professor and executive officer. The first President, the Rev. James Dougherty, was elected in 1875, and was succeeded in the following year by the Rev. E. P. Tenney. From 1885 to 1888 there was no President, but the work of teaching was carried on without interruption. At this time there was only one building on the campus, Palmer Hall, now known as Cutler Academy, erected in 1880.

In the autumn of 1888 William Frederick Slocum was elected President. The faculty was at once enlarged, the courses reorganized, and Cutler Academy incorporated as an associated preparatory school, in which students have since been trained, not only for Colorado College, but for all the leading institutions of the United States. Within the following two years $100,000 was given toward endowment, entirely from within the State of Colorado. Hagerman Hall was built in 1889. In the same year the Woman's Educational

Society was organized and began the work of building Montgomery Hall. In 1890 the Colorado College Scientific Society was founded, and the first number of its publication, "Colorado College Studies," was issued.

Within the past fifteen years the endowment has been raised to $400,000 and the growth of the College in numbers has been equalled by an appropriate enlargement of equipment and activity. Among the marks of advance are the library building, given by the late N. P. Coburn; the Observatory, the gift of Henry R. Wolcott of Denver; and Ticknor Hall, completed in 1897. The entire cost of this building, exceeding $23,000, was met by Miss Elizabeth Cheney of Wellesley, Mass. In 1900 the Perkins Fine Arts Hall was built at a cost of $30,000. The first floor is an auditorium, used for the religious services of the College and for other public meetings; the second story is occupied by the Departments of Fine Arts and Music. McGregor Hall, a third residence for young women, was opened in September, 1903, and later in the same year, Palmer Hall was completed at a cost of $287,000, its equipment costing $50,000 additional. It contains the general offices of administration, recitation rooms, and the laboratories for scientific work in all departments.

At the beginning of the College year 1903-04 a School of Engineering was opened in connection with the College to meet the increasing demand in the Rocky Mountain region for instruction in applied science. The number of engineering students already enrolled has encouraged the Trustees to develop this department to the fullest degree of efficiency.

Through the generosity of General William J. Palmer and Doctor William A. Bell, who in 1905 presented to the College a tract of land called Manitou Park, the foundation has been laid for a School of Forestry.

The growth of the institution in many directions and the steady elevation of its standards of work have won for it an assured position. It is able to offer to its students educational facilities of the same grade as are found at Eastern institutions of the higher learning.

Trustees

WILLIAM F. SLOCUM, *President of the Board,* - 24 College Place.

WILLIS R. ARMSTRONG, - - - - - - 1415 N. Nevada Ave.

GEORGE W. BAILEY, - - - - - 309 McPhee Building, Denver.

REV. EDWARD H. BRAISLIN, D. D., - - - - - Burlington, N. J.

JOHN CAMPBELL, - - - - - - - 1401 Gilpin St., Denver.

ROBERT F. COYLE, D. D., - - - - 1650 Sherman Ave., Denver.

REV. JAMES B. GREGG, D. D., - - - - - - - 9 E. Dale St.

J. J. HAGERMAN, - - - - - - - - Roswell, New Mexico.

THOMAS S. HAYDEN, - - - - - 1637 Sherman Ave., Denver.

IRVING HOWBERT, - - - - - - - - - - 17 N. Weber St.

WILLIAM S. JACKSON, - - - - - - - - 230 E. Kiowa St.

WILLIAM LENNOX, - - - - - - - 1001 N. Cascade Ave.

HORACE G. LUNT, - - - - - - - - 431 N. Cascade Ave.

WILLIAM J. PALMER, - - - - - - - Out West Building.

GEORGE FOSTER PEABODY, - - - - 54 Williams St., New York.

PHILIP B. STEWART, - - - - - - - - - 1228 Wood Ave.

MAHLON D. THATCHER, - - - - - - - Hill Crest, Pueblo.

FRANK TRUMBULL, - - - - - - 1439 Franklin St., Denver.

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William F. Slocum, President.

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Faculty

WILLIAM FREDERICK SLOCUM, D.D., LL.D., 24 College Place.

President and Head Professor of Philosophy.

A. B. (Amherst), '74; B. D. (Andover), '78; LL.D. (Amherst), '93; LL. D. (Nebraska), '94; D. D. (Beloit), '01; LL. D. (Illinois College), '04; Colorado College, '88.

LOUIS A. E. AHLERS, A. M. 1428 Wood Ave.

Head Professor of Germanic Languages and Literatures.

A. B. (Harvard), '94; A. M. (*ibid.*), '04; Colorado College, '95.

J. ROY ARMSTRONG, B. S. 1720 Wood Ave.

Assistant Professor of Electrical Engineering.

B. S. (Armour Institute), '05; Colorado College, '05.

KURNAL R. BABBITT, LL. M. 1412 N. Cascade Ave.

Lecturer on Law.

LL. B. (Columbian Univ.), '88; LL. M. (*ibid.*), '89; Colorado College, '04.

ALFRED A. BLACKMAN, M. D. 801 N. Nevada Ave.

Medical Adviser.

M. D. (University of Denver), '02; Colorado College, '04.

ERNEST BREHAUT, A. M. 611 N. Tejon St.

Assistant Professor of Latin.

A. B. (Dalhousie), '94; A. B. (Harvard) ,'96; A. M. (*ibid.*), '97; Colorado College, '98.

MARIANNA BROWN, A. M. McGregor Hall.

Registrar and Instructor in English.

A. B. (Earlham College), '76; A. M. (Cornell), '94; Colorado College, '02.

FLORIAN CAJORI, PH. D. 1119 Wood Ave

Dean of the School of Engineering, and Head Professor of Mathematics.

S. B. (Wisconsin), '83; M. S. (*ibid.*), '86; PH. D. (Tulane), '94; Colorado College, '89.

CHARLES G. COLLAIS. 613 E. Cache la Poudre St.

Superintendent of Mechanical Laboratories.

FRED CRABTREE, S. B. 723 N. Nevada Ave.

Professor of Mining and Metallurgy.

S. B. (Massachusetts Institute of Technology), '89; Colorado College, '04.

DONALD DEWITT, A. B. Hagerman Hall.

Instructor in Public Speaking.

A. B. (Colorado College), '03; Colorado College, '03.

GEORGE IRVING FINLAY, PH. D. 817 N. Cascade Ave.

Professor of Geology, Mineralogy and Paleontology.

A. B. (Harvard), '98; PH. D. (Columbia), '03; Colorado College, '03.

M. CLEMENT GILE, A. M. 1121 N. Tejon St.

Head Professor of Classical Languages and Literatures.

A. B. (Brown), '83; A. M. (*ibid.*), '86; Colorado College, '92.

HENRY C. HALL, A. B., LL. B. 1401 Wood Ave.

Lecturer on Law.

A. B. (Amherst), '81; LL. B. (Columbia), '83; Colorado College, '03.

FREDERIC R. HASTINGS, A. M. 1501 Wood Ave.

Lecturer on History of Philosophy.

PH. B. (Colorado College), '91; A. M. (*ibid.*), '92; Colorado College, '99.

ELIJAH CLARENCE HILLS, A. B. 1111 Wood Ave.

Head Professor of Romance Languages and Literatures.

A. B. (Cornell), '92; Colorado College, '02.

EDITH PRESTON HUBBARD, A. B. McGregor Hall.
Instructor in Mathematics.
A. B. (Vassar), '01; Colorado College, '02.

RUTH LOOMIS, A. B. Ticknor Hall.
Dean of Women.
A. B. (Vassar), '85; Colorado College, '96.

FRANK HERBERT LOUD, PH. D. 1203 N. Tejon St.
Professor of Mathematics and Astronomy.
A. B. (Amherst), '73; A. M. (Harvard), '99; PH. D. (Haverford), '00; Colorado College, '77.

GEORGE JOHN LYON, B. Sc., C. E. Hagerman Hall.
Professor of Civil Engineering.
B. Sc. (Nebraska), '99; C. E. (Columbia), '04; Colorado College, '04.

HENRY McALLISTER, JR., B. L. 1231 N. Nevada Ave.
Lecturer on Law.
B. L. (Swarthmore), '92; Colorado College, '03.

HOWARD MOORE, C. E. 1140 Wood Ave.
Instructor in Graphics.
C. E. (Princeton), '93; Colorado College, '03.

ATHERTON NOYES, A. B. 10 E. Columbia St.
Assistant Professor of English.
A. B. (Yale), '85; Colorado College, '92.

MANLY D. ORMES, A. B., B. D. 314 E. Columbia St.
Librarian.
A. B. (Yale), '85; B. D. (*ibid.*), '89; Colorado College, '04.

MARION EDWARDS PARK, A. B. McGregor Hall.
Instructor in Greek and Latin.
A. B. (Bryn Mawr), '98; Colorado College, '02.

EDWARD S. PARSONS, A. M., B. D., LITT. D. 1328 N. Nevada.

Vice President, Dean and Bemis Head Professor of English.

A. B. (Amherst), '83; A. M. (*ibid.*), '86; B. D. (Yale), '87; Litt. D. (Amherst), '03; Colorado College, '92.

SIDNEY F. PATTISON, A. B. Y. M. C. A.

Assistant Professor of English.

A. B. (Rochester), '98; A. B. (Williams), '99; Colorado College, '99.

HENRY ALFORD RUGER, A. M. Hagerman Hall.

Assistant Professor of Philosophy and Education.

A. B. (Beloit), '95; A. M. (Chicago), '05; Colorado College, '04.

EDWARD C. SCHNEIDER, PH. D. 4 Pelham Place.

Professor of Biology.

B. S. (Tabor), '97; PH. D. (Yale), '01; Colorado College, '03.

JOHN CUTLER SHEDD, PH. D. 1103 Wood Ave.

Professor of Physics.

A. B. (Princeton), '91; M. S. (Cornell), '92; PH. D. (Wisconsin), '99; Colorado College, '00.

WILLIAM STRIEBY, A. M., E. M. 805 N. Cascade Ave.

Professor of Chemistry and Metallurgy.

A. B. (University of New York), '75; E. M. (Columbia School of Mines), '78; A. M. (University of New York), '79; Colorado College, '80.

WILLIAM C. STURGIS, PH. D. Las Pampas.

Lecturer on Botany.

A. B. (Harvard), '84; A. M. (*ibid.*), '87; PH. D. (*ibid.*), '89; Colorado College, '03.

THOMAS K. URDAHL, PH. D. 1107 Wood Ave.

Professor of Political and Social Science.

B. L. (Wisconsin), '91; M. L. (*ibid.*), '92; PH. D. (*ibid.*), '97; Colorado College, '00.

O. B. WILLCOX, LL. B. 1515 Wood Ave.

Lecturer on Law.

LL. B. (Michigan), '89; Colorado College, '04.

EDWARD DANFORTH HALE, A. M. 1123 N. Weber St.

Dean of the School of Music and Professor of the Theory and Literature of Music, and the Pianoforte.

A. B. (Williams), '80; A. M. (*ibid*), '83; Professor at the New England Conservatory, '85-'04; Colorado College, '05.

MRS. ROBERT BRISCOE. 801 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95; Colorado College, '00.

MRS. FREDERICK A. FAUST. 112 E. Dale St.

Instructor in Pianoforte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

MRS. GEORGE MAJORS PERRY. 120 E. San Rafael St.

Instructor in Voice Culture.

Oberlin Conservatory, '98-'02; Pupil of Mrs. Seabury Ford, William Saal, Felix Hughes, Herbert Witherspoon; Colorado College, '05.

ROBERT W. STEVENS. 18 E. San Miguel St.

Instructor in Pianoforte, Organ and Orchestration.

Pupil of Zeisler, Pratt, Sherwood, Godowski, Theodore Thomas; Colorado College, '05.

Committees of the Faculty

Accredited Schools: Professors Ruger, Gile, Strieby.

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Courses of Study of Individual Students: Professors Parsons, Noyes, Schneider, Miss Brown, Miss Loomis.

Discipline: The President, Professors Parsons, Cajori, Gile, Schneider, Miss Loomis.

Engineering: Professors Cajori, Crabtree, Lyon, Armstrong, Mr. Collais.

Extension Lectures: Professors Ahlers, Noyes, Urdahl.

Fraternities: Professors Cajori, Gile, Hills, Miss Loomis.

Music: Professors Hale, Parsons, Mr. Stevens, Mrs. Faust.

Post-Graduate Degrees: Professors Urdahl, Ahlers, Finlay, Hills, Miss Park.

Publications: Professors Brehaut, Loud, Pattison, Urdahl, Miss Hubbard.

Publicity: Professors Ahlers, Noyes.

Schedule: Professors Shedd, Loud, Lyon, Noyes, Pattison.

Scholarships: The President, Professors Cajori, Gile, Parsons, Miss Brown, Miss Loomis.

Students' Self-Help: Professor Ruger, Mr. Collais, Mr. DeWitt, Mr. Moore.

Class Officers: *Seniors,* The President; *Juniors,* Professor Ruger; *Sophomores,* Professor Schneider; *Freshmen,* Professor Hills; *Special Students,* Professor Noyes.

Admission

REGISTRATION.

Before registering, each candidate must present to the Dean a certificate of moral character signed by some responsible person in the community in which he has made his home. Students are required to register promptly and attend the first exercises in their courses.

ENTRANCE REQUIREMENTS.

1. ENGLISH, 3 units.*
2. HISTORY, 1 unit.
3. MATHEMATICS, 2 units (preferably 3).
4. LATIN, GERMAN, OR FRENCH, 4 units, of which 2 must be Latin.
5. SCIENCE, 2 units (to be selected from the list of sciences given below in 6; but the student is advised to offer Chemistry and Physics. If the student offers Greek, only one unit of Science is required).
6. ELECTIVES, sufficient to make a total of 16 units.
   - Greek, 1, 2 or 3 units.
   - German, 1 or 2 units.
   - French, 1 or 2 units.
   - Spanish, 1 or 2 units.
   - Mathematics, 1 unit.
   - History, 1 unit.
   - Chemistry, 1 unit.
   - Physics, 1 unit.
   - Physiology, ½ unit.
   - Zoology, ½ unit.
   - Botany, ½ unit.
   - Physiography, ½ unit.
   - Geology, ½ unit.
   - Mechanical Drawing, 1 unit.

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*A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 45 minutes each a week.

UNIT COURSES IN PARTICULAR SUBJECTS.

1. ENGLISH—(3 units).

(*a.*) A practical knowledge of grammar and the elements of rhetoric.

(*b.*) A thorough study of the subject matter and style of the following works:

For 1906, 1907, and 1908: Shakespeare's Julius Cæsar; Milton's Lycidas, Comus, L'Allegro and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

(*c.*) A careful but not minute study of the following works, sufficient to give the candidate a clear idea of their important parts:

For 1906, 1907, and 1908: Shakespeare's The Merchant of Venice and Macbeth; The Sir Roger de Coverley Papers in The Spectator; Irving's Life of Goldsmith; Coleridge's The Ancient Mariner; Scott's Ivanhoe and Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Lowell's The Vision of Sir Launfal; George Eliot's Silas Marner.

2. HISTORY—(1 unit). An outline knowledge of the leading facts of either Ancient, Greek and Roman, Mediæval and Modern, American, or English history.

(*a.*) Ancient History: Myers and Botsford, Myers, West, or an equivalent.

(*b.*) Greek and Roman: Botsford, Allen, or an equivalent.

(*c.*) Mediæval and Modern: Myers, or an equivalent.

(*d.*) American: Channing, McLaughlin, Thomas, Johnston, Montgomery, or an equivalent.

(*e.*) English: Larned, Coman and Kendall, Montgomery, or an equivalent.

3. MATHEMATICS—(2 units; preferably 3).

(*a.*) Algebra, through simultaneous quadratic equations (1 unit).

(*b.*) Elementary Plane Geometry: the first five books of Phil-

lips and Fisher's, Wells', or Wentworth's Geometry, or an equivalent (1 unit).

(*c.*) Solid and Spherical Geometry (½ unit).

(*d.*) Plane Trigonometry (½ unit).

It is recommended that Algebra and Plane Geometry be reviewed in the last year of the preparatory course.

4. LATIN—(*a.*) An accurate and ready knowledge of grammatical forms. Cæsar's Gallic War, Bks. I-IV, or an equivalent. Prose Composition based on Cæsar. Careful attention should be given from the beginning to correct pronunciation of the Latin and to the use of idiomatic English in translation. (2 units).

(*b.*) Cicero: seven orations. The following are recommended: The four orations against Catiline, Archias, the Manilian Law, Marcellus. Translation at sight of easy passages of prose. Prose Composition. (1 unit).

(*c.*) Vergil: Aeneid, Bks. I-VI. Prose Composition based on Cicero. (1 unit).

5. GREEK—(*a.*) White's First Greek Book, or an equivalent. Xenophon's Anabasis (20 or 30 pages). Practice in sight translation. The rules of accentuation. (1 unit).

(*b.*) Four Books of the Anabasis. Reading at sight. Prose Composition based on the Anabasis. Careful grammatical study. (1 unit).

(*c.*) Three books of the Iliad with prosody and dialectic forms. Sight translation. Prose Composition. (1 unit).

6. GERMAN, FRENCH AND SPANISH—(*a.*) The work of the first year should comprise: (1) Drill in the rudiments of grammar; (2) careful drill in pronunciation; (3) the memorizing and frequent repetition of easy colloquial sentences; (4) abundant easy exercises; (5) the reading in graduated texts of from 75 to 100 pages of German, or from 100 to 175 pages of French or Spanish prose.

(*b.*) The work of the second year should comprise: (1) The careful reading of from 150 to 200 pages of German literature, or from 250 to 400 pages of French or Spanish literature, in the form of easy stories or historical or bio-

graphical sketches; (2) accompanying practice, as before, in the translating from English of easy variations from the matter read, and also in off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill in the rudiments of grammar.

A good selection of texts for the second year, arranged in suitable order for reading, would be:

German: Andersen, *Maerchen* or *Bilderbuch;* Leander, *Traeumereien;* Hauff, *Das kalte Herz;* Zschokke, *Der zerbrochene Krug;* Hillern, *Höher als die Kirche;* Storm, *Immensee; Der Schwiegersohn;* Heyse, *L'Arrabiata, Das Maedchen von Treppi, Anfang und Ende;* Jensen, *Die Braune Erica.*

French: (1) Mairet, *la Tâche du petit Pierre,* Malot, *Sans famille,* or Bruno, *le Tour de la France;* (2) Labiche and Martin, *le Voyage de M. Perrichon;* Halévy, *l'Abbé Constantin,* or Merimée, *Colomba;* (3) Dumas, *la Tulipe noire,* or Erckmann-Chatrian, *Madame Thérèse;* (4) Sarcey, *le Siège de Paris,* or Lamartine, *Jeanne d'Arc;* (5) Daudet, *Contes,* or George Sand, *la Mare au diable.*

Spanish: (1) Valera, *El pájaro verde,* and Alarcón, *El Capitán Veneno,* or about 100 pages of Padre Isla's version of *Gil Blas;* (2) Pérez Galdós, *Doña Perfecta* or *Marianela;* (3) Echegaray, *Ó locura ó santidad,* Ramos y Vidal, *Zaragueta,* or Moratin, *El sí las niñas.*

A third and a fourth year of German or French will be accepted as an elective entrance subject if the work has been done satisfactorily. Candidates for admission to Colorado College are advised to present two units of German, French, or Spanish, as preparatory to admission to the German B, French B, or Spanish B, given in the College.

7. Physics—(1 unit). Not less than two hours a week of recitation, and four of laboratory work; Carhart and Chute's Elements of Physics, Wentworth and Hill's Text-Book of Physics, or an equivalent.

8. Chemistry—(1 unit). Williams' Elements of Chemistry, or an equivalent.

9. Physiology—(½ unit). Textbook work should cover such a text as Blaisdell's "Practical Physiology." In addition, the course should include a rough dissection, by the teacher, of the frog and cat, and a microscopic examination of the more important tissues.

10. Zoology—(½ unit). Textbook work equal in amount to that contained in Kellogg, Jordan or Davenport; laboratory work on the structure of at least ten forms and a comparison with other types. The drawings and descriptions in the candidate's laboratory note-book must be certified by the teacher.

11. Botany—(½ unit). The requirements include a knowledge of the structure and more important physiological processes of flowering plants, also of the modifications of parts for special functions, of the plant societies, pollenation and dissemination. It is also desirable that the candidate have the ability to identify ordinary seed plants. A laboratory notebook certified by the teacher must be presented by the candidate. Such texts as Bergen's "Foundation of Botany" and Coulter's "Plant Studies" are recommended.

12. Physiography—(½ unit). Tarr, Davis, Dryer, or an equivalent.

13. Geology—(½ unit). Scott's Introduction to Geology, or an equivalent, with practice in the determination of the commoner rocks, igneous, sedimentary and metamorphic.

14. Mechanical Drawing—(1 unit).

ADMISSION BY CERTIFICATE.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to the above requirements, will be admitted without condition into the Freshman Class. Each candidate must bring from the principal of the school last attended a personal statement as to his grade of scholarship.

ACCREDITED SCHOOLS.

The following schools are on the accredited list. Certificates of the satisfactory completion, in any of them, of any branch in the

course of study required for admission to the College, will be accepted in place of an examination.

Aspen High School.
Canon City High School.
Canon City So. Side High School.
Central City High School.
Cheyenne (Wyo.) High School.
Colorado Springs High School.
Cripple Creek High School
Delta High School.
Denver: High School, Dist. No. 1.
" High School, Dist. No. 2.
" High School, Dist. No. 7.
" High School, Dist. No. 17.
" Manual Training High School.
Douglas Co. H. S., Castle Rock.
Durango High School.
Florence High School.
Fort Collins High School.
Fort Morgan High School.
Fruita High School.
Georgetown High School.
Glenwood Springs High School.
Golden High School.
Gordon Academy, Salt Lake City
Grand Junction High School.
Greeley High School.
Idaho Springs High School.
Leadville High School.
Longmont High School.
Loveland High School.
Manitou High School.
Monte Vista High School.
Otero Co. High School, La Junta.
Ouray High School.
Pueblo High School, Dist. No. 1.
" High School, Dist. No. 20.
Salida High School.
Telluride High School.
Trinidad High School.
Victor High School.
Walsenberg High School.
Wheat Ridge High School, Alcott.
Miss Wolcott's School, Denver.
Wolfe Hall, Denver.

Certificates from schools not on the accredited list will be considered as the merits of each case may warrant.

ADMISSION BY EXAMINATION.

Candidates for admission, unless admitted by certificate, must pass examinations in the requirements indicated above. Such examinations will be held in Palmer Hall on Wednesday, May 30, and Thursday, May 31, 1906, and again on Tuesday, September 11, 1906.

ADMISSION TO ADVANCED STANDING.

Students will be received into advanced classes on examination in the studies previously pursued. The Faculty may, at their discre-

tion, receive certificates from other colleges as evidence that the student has satisfactorily pursued those or equivalent studies.

SPECIAL STUDENTS.

Special students will be received, at the discretion of the Faculty, into such classes as they are qualified to enter. It is the rule of the College that such students must attend the examinations as well as the ordinary recitations of their classes, subject to the same conditions as other students.

Several of the courses of lectures which form part of the College instruction, particularly in the department of Philosophy, are open to the public on payment of a small fee, and without any requirement of examination.

Course of Study

In the College, only one degree is given, that of Bachelor of Arts. To secure this degree the student will be required to complete a course of study consisting of (1) certain prescribed studies, (2) a specified number of hours in a major subject, (3) enough free electives to bring his work up to the total requirement of 60 hours, making an average of 15 hours a week throughout the four years.

PRESCRIBED STUDIES.

FRESHMAN YEAR.....Mathematics A (1), A (2), A (3), 4 hours.
English B, 3 hours.
And one of the following groups:

1. Greek, Latin, and German or French.
2. Greek, German or French, and Science.
3. Latin, German or French, and Science.
4. German, French, and Science.

Each subject in the above four groups comes three times a week. The course in Science must be Chemistry, Physics, or Biology. If the student does not elect Science in the Freshman year, he must take it in the Sophomore year.

SOPHOMORE YEAR.....English C and D, 3 hours.
History, 2 hours.

JUNIOR YEAR.....Philosophy A and B, 3 hours.
Economics A, first half-year, 2 hours.

SENIOR YEAR.....Philosophy C and D, 4 hours.

MAJOR SUBJECT.

In addition to the above prescribed subjects, each student shall select a major subject, or specialty, if possible before the end of the Sophomore year, and, in any case, not later than the beginning of the Junior year. The professor in charge of the major subject will act as the student's adviser, and will have authority, with the Dean,

to require the completion of work amounting to fifteen (15) hours in the major subject, or in the major subject and in such minor subjects as he shall consider necessary, or collateral, work. Mention of the major subject will be made in the diploma.

Any one of the following may be selected by the student as his major subject: (1) Philosophy; (2) Education; (3) Greek; (4) Latin; (5) English; (6) German; (7) Romance Languages; (8) Economics and Political Science; (9) History; (10) Mathematics; (11) Astronomy; (12) Physics; (13) Chemistry; (14) Biology; (15) Geology.

All courses except English B and C, and Mathematics A may be counted as part of the requisite fifteen (15) hours.

Petitions to change the major subject will be granted only when approved by the professors in charge of both the old and the new subjects, and when granted, the student will be held to all the requirements of the new major subject. In no case can the major subject be changed later than the beginning of the Senior year.

ELECTIVES.*

The student shall elect from the list given below, in addition to the prescribed subjects and the major subject, a sufficient number of courses to bring the total amount of his College work up to sixty (60) hours. Of the following list of electives, not all will be given in any one year. Each continues through the year, unless it is otherwise stated.

PHILOSOPHY.—(p. 32) Hours per week.

E. *Modern German Philosophy;* first half-year..... 2
F. *The Philosophical Movement in England;* second half-year..... 2
G. *Advanced Logic;* second half-year..... 2
H. *Lotze;* second half-year..... 2
I. *Seminary in Social Ethics;* second half-year..... 1
J. *Seminary in Greek Philosophy;* one half-year..... 1
K. *Evolution of Religious Thought;* second half-year..... 2
L. *Experimental Psychology;* second half-year..... 2
M. *Advanced Psychology;* first half-year..... 2

*Unless otherwise stated, each course continues through the year.

EDUCATION.—(p. 35)

	Hours per week.
A. *History of Education;* first half-year	3
B. *Genetic Psychology*	3
C. *Research Work in Psychology and Education*	.
D. *Play in Animals and Man and its Bearing on Education;* first half-year	1
E. *Philosophy of Education;* second half-year	3
F. *Journal Club*	1
G. *Educational Classics*	2

GREEK.—(p. 36)

A. *Selections from Homer, Plato and Herodotus*	3
B. *Drama*	3
C. *History;* one half-year	3
D. *Philosophy;* one half-year	3
E. *Epic and Lyric Poetry;* one half-year	3
F. *Course for Teachers;* one half-year	3
I. *New Testament;* second half-year	3
H. *History;* second half-year	2

LATIN.—(p. 37)

A. *Course for Freshmen*	3
B. *Course for Sophomores*	3
C. *Drama;* one half-year	3
D. *Catullus and the Elegiac Poets;* one half-year	3
E. *Satire;* one half-year	3
G. **Vergil;* one half-year	3
H. **Course for Teachers;* one half-year	3
J. **Roman History;* second half-year	3

ENGLISH.—(p. 38)

D. *Outline of American Literature;* second half-year	3
G. *Chaucer and Spenser;* first half-year	3
H. *English Drama, through Marlowe;* first half-year	3
I. *Shakespeare;* second half-year	3
J. *Shakespeare*	2
K. *Milton;* first half-year	3
L. *English Poetry from Dryden to Burns;* first half-year	3

*Not given in 1906-07.

Hours per week.

M. *Keats, Shelley, Byron, Coleridge, Wordsworth;* second half-year 3
N. *Tennyson and Browning;* first half-year 3
O. *Modern English Prose;* second half-year 3
P. *Old English;* first half-year 3
Q. *Beowulf;* second half-year 3
R. *Lyrics;* second half-year 2
S. *Outline History of English Literature;* first half-year . . . 3
T. *Advanced Composition;* second half-year 2
U. *English Novelists of the Nineteenth Century* 3
V. *Greek Drama for English Readers;* second half-year 3

PUBLIC SPEAKING.—(p. 39)

A. *Declamation* 1
B. *Oratory* 2
C. *Debate;* first half-year 2
D. *Extempore Speaking* 1
E. *Reading Course* 1

GERMAN.—(p. 40)

A. *Elementary Course* 3
B. *Intermediate Course* 3
C. *Schiller and Goethe;* first half-year 2
D. *Lessing and Goethe;* second half-year 2
E. *History of German Literature* 1
F. *The Nibelungenlied* 2
G. *Middle High German;* one half-year 3
I. *Faust* 2
K. **Poetry of Goethe and Schiller* 2
L. *Teachers' Review* 3
M. *Nineteenth Century Literature* 3

FRENCH.—(p. 42)

A. *Elementary Course* 3
B. *Intermediate Course* 3
C. **Classical French Literature* 2
D. *Nineteenth Century Literature* 2

*Not given in 1906-07.

Hours per week.

E. *Molière* 2
J. *Nineteenth Century Fiction* 2
H. *Old French* 2
I. *French Phonetics and Colloquial French* 1

SPANISH.—(p. 44)

A. *Elementary Course* 3
B. **Modern Spanish Literature* 2
C. *Classical Spanish Literature* 2
D. *Contemporaneous Spanish Fiction* 2

ITALIAN.—(p. 45)

A. *Elementary Course* 2
B. *Literature of the Thirteenth and Fourteenth Centuries* . . 2

ECONOMICS.—(p. 45)

B. *Charities and Corrections;* second half-year 3
C. **Money and Banking;* first half-year 3
D. **Socialism;* first half-year 3
E. *Colonial Policy;* first half-year 2
F. **Economic and Social History of the United States* 3
G. *Public Finance;* second half-year 3
H. *Seminary;* second half-year 3

POLITICAL SCIENCE.—(p. 47)

A. **Historical Politics;* first half-year 3
B. **Comparative Politics;* second half-year 3

HISTORY.—(p. 48)

B. *American* 3
C. **The Napoleonic Era and Modern Times;* second half-year 2
D. **Modern European History;* first half-year 2
E. *Mediaeval History* 2
G. *Seminary in American History* 3

LAW.—(p. 49)

A. *Elementary Law;* first half-year 3
B. *American Constitutional Law;* second half-year 3

*Not given in 1906-07.

	Hours per week.
C. *Contracts	2
D. Torts	2
E. *Domestic Relations and the Law of Persons	2
F. Property	2
G. *Mining Law	1

MATHEMATICS.—(p. 51)

B. (1.) *Analytical Geometry* (elementary); first half-year	3
B. (2.) *Analytical Geometry* (more advanced); second half-year	3
C. *Calculus, Differential and Integral;* first half-year	3
C. *Calculus, Differential and Integral;* second half-year	4
D. *History and Logic of Mathematics;* one half-year	2
E. *Modern Methods in Geometry;* one half-year	3
F. *Theory of Equations;* one half-year	3
H. *Determinants;* one half-year	2
I. *Elementary Surveying;* second half-year	3
J. *Theoretical Mechanics*	4

ASTRONOMY.—(p. 52)

A. *Elementary Astronomy;* second half-year	3
B. *Observations and Computations;* first half-year	3
C. *Celestial Mechanics*	2
D. *Elementary Meteorology;* second half-year	3
F. *Stellar Photography;* one half-year	.

PHYSICS.—(p. 53)

A. *General Physics*	3 or 4
B. *General Physics*	4
C. *Theoretical Physics*	2
D. *Practical Physics*	1 or 2
E. *Advanced Physics*	2
G. *Problem Work*	1 or 2
K. *Precise Measurements in Electricity and Magnetism*	2

CHEMISTRY.—(p. 55)

A. *Elementary Chemistry*	3
B. *Advanced Chemistry*	3

*Not given in 1906-07.

Hours per week.

C. *Qualitative Analysis* 4
D. *Quantitative Analysis* 4
E. *Organic Chemistry* 3
F. *Theoretical Chemistry* 3
G. *Medical Chemistry* 4
H. *Agricultural Chemistry* 3

BIOLOGY.—(p. 57)

A. *General Biology* 3
B. *Zoology* 3
C. *Physiology* 3
D. *Comparative Anatomy of Vertebrates;* first half-year.... 3
E. *Mammalian Anatomy;* second half-year..... 3
F. **Histology;* first half-year..... 3
G. **Embryology and Cytology;* second half-year..... 3
H. *Bacteriology* 2
I. *Sanitary Science and Public Health*..... 1
J. **Plant Physiology;* first half-year..... 2
K. *Systematic Botany: Seed Plants;* second half-year..... 3

GEOLOGY.—(p. 60)

A. *General Geology* 3
B. *Mineralogy* 3
E. *Economic Geology* 3
F. *Invertebrate Paleontology;* first half-year..... 3
G. **Vertebrate Paleontology;* first half-year..... 3
H. *Petrography;* second half-year..... 3
I. *Field Geology.*

BIBLE STUDY.—(p. 61)

Old Testament Literature 2

MUSIC.—(p. 92)

A. *General Musical Culture* 2

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*Not given in 1906-07.

†For the course in Music an additional tuition will be charged.

Departments of Instruction

PHILOSOPHY.

PRESIDENT SLOCUM, ASSISTANT PROFESSOR RUGER.

The required work in this department extends over the Junior and Senior years, and gives the student a knowledge of the development of thought in the several departments of philosophy. The various seminary courses afford training in the study and discussion of important psychological, sociological and ethical questions.

A. I. *Psychology.*—First half-year, 3 hours.—PROFESSOR RUGER.

1. *Neurology.* Anatomy and physiology of the nervous system. Stereopticon lectures presenting the gross and microscopic character of the nervous system. Charts, models and a collection of brains afford further illustrative material for comparative and human neurology. References: *Barker, Donaldson, Loeb, etc.*

2. *General Psychology.*—The general characters and problems of consciousness; the functional point of view in psychology. Especial attention will be given to the psychology of the thought processes. Lectures, demonstrations, experiments by the class, recitations and reports on special topics. References: *Thorndike, Angell, James, Stout, Titchener, Jastrow, Baldwin, etc.*

II. *Logic.*—Second half-year, 3 hours. Formal logic and the logic of science. Lectures, recitations, reports and criticisms of arguments and methods of research. Problems in epistemology and metaphysics will be raised throughout, and the course will thus serve as an introduction to philosophy. Text, Hibben's *Logic Deductive and Inductive.* Collateral reading. —PROFESSOR RUGER.

L. *Experimental Psychology.*—A laboratory course. Sensation including psychophysics, perception, motor changes in cognitive and effective processes, memory, association, fatigue, reaction; statistical methods. The problems of space perception will

receive especial attention. References: *Titchener, Sanford, Woodworth, Stratton, Witmer, Bourdon.*—Second half-year, 2 hours.

M. *Advanced Psychology.*—Special topics such as belief, attention, consciousness of self, the emotions, body and mind. Discussions and reports. References: *James, Bain, Mill, Stout, Ward, Hobhouse, Strong.*. First half-year, 2 hours.

C. *History of Philosophy.*—First half-year, 4 hours.—President Slocum.

1. *Lectures, Recitations and Conferences.*—3 hours.

(*a.*) Study in Comparative Religions.

(*b.*) Greek Philosophy. 20 lectures.

(*c.*) Modern Philosophy. Lectures: (1) The Rise and Fall of Scholasticism; (2) The Beginnings of Modern Philosophy — Bacon and Descartes; (3) Spinoza; (4) Locke; (5) The Skeptical Movement in France; (6) Leibnitz; (7) Berkeley; (8) Hume; (9) Kant, The Critique of Pure Reason; (10) Kant, The Transcendent Element in his Philosophy; (11) Hegel; (12) Schopenhauer; (13) Lotze; (14) Spencer—The Philosophy of Evolution.

2. *Metaphysical Seminary.*—1 hour.

Presentation of papers and discussion of the following subjects:

(*a.*) Great Religions of the World.

(*b.*) Psychological Basis of Religious Faith.

(*c.*) Psychological Basis of Æsthetics.

(*d.*) Philosophical Thought in England during the Nineteenth Century.

(*e.*) Evolution: Its History, Development and Results.

D. *Ethics.*—Second half-year, 4 hours.—President Slocum.

1. *Janet's Theory of Morals.*—Lectures, theses and discussions. 3 hours.

(*a.*) The Fundamental Principles of Ethics, 12 lectures.

(*b.*) Christian Ethics. 3 lectures.

2. *Ethical Seminary.*—1 hour.

Presentation of papers and discussion upon the following subjects:

(*a.*) Modern Social and Sociological Problems.

(*b.*) The Ethical View of Citizenship.

(*c.*) A Study of Educational Theories from an Ethical standpoint.

E. *Modern German Philosophy.*—First half of Senior year, 2 hours. —President Slocum.

F. *The Philosophical Movement in England.*—Second half of Senior year, 2 hours.—President Slocum.

G. *Advanced Logic.*—Second half-year, 2 hours.—President Slocum.

H. *Lotze.*—Second half-year, 2 hours.—President Slocum.

I. *Seminary in Social Ethics.*—The Labor Question, Temperance, Pauperism and other social problems considered from an ethical standpoint. Second half-year, 1 hour.

J. *Seminary in Greek Philosophy.*—One half-year, 1 hour.

K. *The Evolution of Religious Thought.*—Second half-year, 2 hours.—Mr. Hastings.

(1) Psychological Basis of Religion; (2) Spiritual Import of Greek Philosophy; (3) Religious Development of the Hebrews; (4) Rise of Christianity; (5) Source and Substance of Revelation; (6) Paul and his Mission; (7) Fusion of Greek and Christian Thought; (8) Mediæval Conceptions of Christianity; (9) Spirit of the Renaissance; (10) Cardinal Principle of the Reformation; (11) Philosophical Awakening; (12) Eighteenth Century Conceptions of Religion; (13) Skepticism; (14) Voltaire and Rousseau; (15) Lessing and Freedom of Thought; (16) Philosophy of

Kant; (17) German Idealism; (18) Mysticism; (19) Romanticism; (20) Goethe: Religion and Culture; (21) German Criticism of Dogma; (22) Coleridge and Wordsworth; (23) Carlyle and his Philosophy of Life; (24) Newman and the Church Revival; (25) Rise of the Critical Mind; (26) Comte and his Religion of Humanity; (27) Agnosticism; (28) Religious Import of Evolution; (29) Arnold and Ethical Idealism; (30) Martineau and Christian Theism; (31) Philosophical Idealism; (32) Present-Day Tendencies in Religious Thought.

EDUCATION.

Assistant Professor Ruger.

A. *History of Education.*—A study of the more important educational theories in their larger relationships. Monroe's *History of Education* will be used as a basis. Each student will be expected to read at least one educational classic and to report on special topics. First half-year, 3 hours.

E. *Philosophy of Education.*—Fundamental principles and their application to modern problems. Text, Bagley's *Educative Process.* Principal References, *Dewey, O'Shea, Horne, Hanus.* Lectures on the kindergarten, school management, and problems of the high school, given by practical experts, will form a part of this course. Provision is made for a limited amount of practice teaching. Second half-year, 3 hours.

B. *Genetic Psychology.*—3 hours. First half-year, Animal and Child Psychology. For the former, a study will be made of the experiments and conclusions of Loeb, Thorndike, Hobhouse, Kinnaman, Watson, Porter, etc. The attempt will be made to trace the typical modes of adjustment, racial and individual, found among animals. For the latter, Kirkpatrick's *Fundamentals of Child Study* will serve as a point of departure. Class reports and discussions.

Second half-year, Adolescence: methods of child study; special problems involving some original investigations.

D. *A Study of Play in Animals and Man and its Bearing on Education.* First half-year, 1 hour.

G. *Educational Classics.* 2 hours.

C. *Research Work in Psychology and Education.*
For graduate students and advanced undergraduates. Hours to be arranged.

F. *Journal Club.*—Meets for two hours on alternate Thursdays.

Note.—For courses in other departments intended especially for teachers see Greek F, Latin H, German L, French F and G, Mathematics D, Physics B.

GREEK.*

PROFESSOR GILE, ASSISTANT PROFESSOR BREHAUT AND MISS PARK.

A. Homer, selections from the *Odyssey* and *Iliad* in the original and all the poems in translation; Plato, *Apology* and *Crito;* Herodotus, selections.—3 hours.

B. *Greek Drama.*—Æschylus, *The Septem* and *Prometheus;* Sophocles, *Antigone;* the remainder of Æschylus' and Sophocles' plays in translation; Euripides, *Alcestis* and *Medea.*—3 hours.

C. *Greek History.*—(*a.*) Herodotus; careful study of the period of the Persian Wars. Reading from the dramatists for further illustration of the life of the period; or, (*b.*) Thucydides, the Sicilian Expedition. Parallel readings in Curtius, Grote and other modern historians. Selections from Plutarch's Lives. One half-year, 3 hours.

D. *Greek Philosophy.*—Plato, *Phaedo.* Selections from other dialogues, and from the works of Xenophon. Zeller's *Socrates and the Socratic Schools.* One half-year, 3 hours.

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*Students who enter without Greek are permitted to take as College work, courses in Greek in Cutler Academy.

E. *Greek Epic and Lyric Poetry.*—Homer, Hesiod and Pindar. One half-year, 3 hours.

F. *A Course designed for Teachers.*—Selections from Xenophon; composition; careful grammatical study. One half-year, 3 hours.

I. *New Testament Greek.*—Open to students who have had one year of Greek. Second half-year, 3 hours.

H. *Greek History.*—An outline from the earliest times down to 146 B. C. A knowledge of Greek is not required. Second half-year, 2 hours.

NOTE.—For a course in Greek Drama for English readers, see English V.

LATIN.

PROFESSOR GILE, ASSISTANT PROFESSOR BREHAUT AND MISS PARK.

A. Livy, Selections from Books XXI and XXII; Cicero, *De Senectute, De Amicitia;* Horace, *Odes.*—3 hours.

B. Horace, Selections from the *Epistles* and *Satires;* Tacitus, *Germania* and *Agricola;* Terence, *Phormio;* Plautus, *Captivi;* Cicero, *Selected Letters.*—3 hours.

C. *Drama.*—Selected plays of Plautus and Terence; history and characteristics of the Roman Drama. One half-year, 3 hours.

D. *Catullus and the Elegiac Poets.*—One half-year, 3 hours.

E. *Satire.*—History and Characteristics of Roman Satire. Selections from Horace, Persius, Juvenal. Parallel readings in English literature. One half-year, 3 hours.

G. *Vergil.*—*The Aeneid,* Books VII-XII; the *Bucolics,* and Selections from the *Georgics.* One half-year, 3 hours.

H. *A Course Designed for Teachers.*—Selections from Cæsar and Cicero; composition; careful grammatical study. One half-year, 3 hours.

J. *Roman History.*—An outline from the earliest times to the fall of the Roman Empire. A knowledge of Latin is not required. Second half-year, 3 hours.

ENGLISH.

PROFESSOR PARSONS, ASSISTANT PROFESSORS NOYES AND PATTISON.

B. *Rhetoric and Composition.*—Elementary Course. 3 hours.

C. *Argumentation.*—Prerequisite, Course B. First half-year, 3 hours.

T. *Advanced Composition.*—Prerequisite, Course C. Second half-year, 2 hours.

D. *American Literature.*—Irving, Cooper, Poe, Bryant, Hawthorne, Longfellow, Emerson, Lowell, Holmes, Whittier. Second half-year, 3 hours.

S. *Outline History of English Literature.*—First half-year, 3 hours.

G. *Chaucer and Spenser.*—The principal poems read critically in class. Life and thought of the times. First half-year, 3 hours.

H. *The English Drama: Through Marlowe.*—Principles and development. First half-year, 3 hours.

I. *The English Drama: Shakespeare.*—The principal plays read chronologically. Second half-year, 3 hours.

J. *Shakespeare.*—A critical text-study of three dramas of Shakespeare. The class meets once a week for a two-period session. —PROFESSOR AHLERS.

K. *Milton.*—A comprehensive study of the poet's personality and work. Given in 1906-07 and every alternate year. First half-year, 3 hours.

L. *English Poetry from Dryden to Burns.*—First half-year, 3 hours.

M. *Keats, Shelley, Byron, Coleridge, Wordsworth.*—Second half-year, 3 hours.

N. *Tennyson and Browning.*—First half-year, 3 hours.

O. *Modern English Prose.* Carlyle, Arnold, Ruskin. Second half-year, 3 hours.

P. *Old English.*—The beginnings of English Literature. Reading is begun at once and the study is made as literary in character as possible. First half-year, 3 hours.

Q. *Old English.*—Beowulf. Prerequisite, Course P. Second half-year, 3 hours.

R. *Lyrics.*—Second half-year, 2 hours.

U. *Nineteenth Century Novelists.*—Jane Austen, Scott, Dickens, Thackeray, George Eliot, Stevenson, Hawthorne. Two recitations; collateral reading: counts 3 hours.

V. *Greek Drama for English Readers.*—Literary study of Aeschylus and Sophocles in poetic translation; lectures on the Greek Theatre and on Greek Art. Second half-year, 3 hours.

PUBLIC SPEAKING.*

Mr. DeWitt.

A. *Declamation.*—One declamation to be prepared and delivered every four weeks. Training in class in reading with expression. Southwick's *Steps to Oratory.* 1 hour.

B. *Oratory.*—An analytical study of the speeches of noted orators. An understanding of the facts bearing upon the man, the subject and the occasion. Lectures on the divisions of the oration. Drill in reading the speeches studied. The preparation and delivery of an oration each half-year. Matthews' *Oratory and Orators,* Clark and Blanchard's *Practical Public Speaking.* 2 hours.

C. *Debate.*—Brief debates before the class; practical suggestions on delivery. First half-year, 2 hours.

D. *Extempore Speaking.*—A brief speech is required each week with a view to general efficiency in public speaking. Criti-

*See Oratorical and Debating Contests, p. 108.

cism and suggestion on thought, expression and delivery. 1 hour.

E. *Reading Course.*—Prerequisite, Course B. Reading and reporting on the speeches of twelve great orators; essays on the men and their achievements. Individual appointments. Text: Cody, *The World's Great Orations.* 1 hour.

GERMAN LANGUAGE AND LITERATURE.*

PROFESSOR AHLERS.

A. *Elementary Course.*—Joynes-Meissner's *Grammar.* Andersen, *Maerchen;* Storm, *Immensee;* Hauff, *Das kalte Herz, Die Karavane;* Eichendorff, *Aus dem Leben eines Taugenichts.* 3 hours.

B. *Intermediate Course.*—Riehl, *Fluch der Schoenheit;* Jensen, *Die Braune Erica;* Chamisso, *Peter Schlemihl;* Heine, *Harzreise;* Gerstaecker, *Germelshausen;* Lessing, *Minna von Barnhelm;* Schiller, *Wilhelm Tell, Lyrics* and *Ballads.* Dictation. *Prose Composition and Syntax.* 3 hours.

C. Schiller, *Maria Stuart, Die Jungfrau von Orleans;* Goethe, *Egmont;* Sime's *Life of Goethe.* Dictation. First half-year, 2 hours.

D. Lessing, *Emilia Galotti, Nathan der Weise;* Rollestone's *Life of Lessing;* Goethe, *Iphigenie.* Dictation. Second half-year, 2 hours.

E. *Outline History of German Literature.*—This course is conducted in English, and is open to all College students, whether they are taking German or not. Kuno Francke's *History of German Literature* will be used as text-book. This reading will be supplemented by lectures. 1 hour.

F. The *Nibelungenlied* and the Classic Period of the Twelfth Century. *Hartman von Aue, Wolfram von Eschenbach, Gott-*

*Authors and books designated under German A, B, C, and D indicate the scope rather than the actual works read in these courses.

fried von Strassburg. Lectures and collateral reading. 2 hours.

G. *Middle High German.* — Braune-Paul's *Mittelhochdeutsche Grammatik; Nibelungenlied; Kudrun; Walter von der Vogelweide.* One half-year, 3 hours.

I. *The Faust Legend and Its Development, and Goethe's Faust.*— Synopsis of the Course:

CHAPTER I. Kindred Legends before the 16th Century. (*a.*) Simon Magus. (*b.*) Ahasuerus. (*c.*) Anthemios, Proterius and Theophilus. (*d.*) Cyprianus Antiochus. (*e.*) Tannhæuser and Don Juan.

CHAPTER II. The historic Faust; the "Faustbuch" of 1587 and its development; the "Puppenspiele."

CHAPTER III. Faust Dramas before the 18th Century.
(*a.*) Calderon's El Magico Prodigioso.
(*b.*) Marlowe's Tragical History of Dr. Faustus.

CHAPTER IV. Faust in the 18th Century.
Lessing's Fragment: Maler Mueller, Klinger, etc.

CHAPTER V. Goethe's Faust.
(*a.*) The "Urfaust."
(*b.*) Faust, Part I. 1808.
(*c.*) Faust, Part II.

This course is conducted entirely in German. The class meets once a week for a two-hour period.

K. *The Poems of Goethe and Schiller.*—This course is conducted entirely in German. The class meets once a week for 2 hours. Given in alternate years: omitted in 1906-07.

L. *A Review for Teachers.*—2 hours; a third hour at the pleasure of the instructor.

M. *Nineteenth Century Literature.*—2 hours; a third hour at the pleasure of the instructor.

Poetry during the wars of liberation; Kleist; Grillparzer; the poems of Uhland and Heine; Friedrich Hebbel; Maria Magdalena, Mutter und Kind, Die Nibelungen; Otto Ludwig: Der Erbförster, Zwischen Himmel und Erde; Emanuel Geibel: Gedichte; Gottfried

Keller: Romeo und Julia auf dem Dorfe; Die Heiterethei; Ludwig Fulda; Hermann Sudermann; Gerhardt Hauptmann; Frenssen.

FRENCH LANGUAGE AND LITERATURE.

PROFESSOR HILLS.

A. *Elementary Course.*—Fraser and Squair's *French Grammar;* Aldrich and Foster's *French Reader;* George Sand, *la Mare au diable;* Alfred de Musset, *Pierre et Camille;* Labiche et Martin, *le Voyage de M. Perrichon.* Writing from dictation, and practice in conversation. 3 hours.

B. 1. *Syntax and Prose Composition.*—Fraser and Squair's *French Grammar,* and composition. 1 hour.

2. *Modern Prose and Poetry.* Daudet, *la Belle Nivernaise;* Anatole France, *le Livre de mon ami;* Augier et Sandeau, *le Gendre de M. Poirier;* Balzac, *le Curé de Tours;* Victor Hugo, *les Misérables* (extracts); Taine, *les Origines de la France contemporaine* (extracts); Bowen's *Modern French Lyrics.* 2 hours.

For outside reading: About, *le Roi des montagnes;* Balzac, *Eugénie Grandet;* Coppée, *Pour la couronne;* Dumas, *les Trois mousquetaires;* Erckmann-Chatrian, *le Conscrit de 1813;* Feuillet, *le Roman d'un jeune homme pauvre;* France, *le Crime de Sylvestre Bonnard;* Lamartine, *Graziella;* Loti, *le Pêcheur d' Islande;* Malot, *Sans famille;* Souvestre, *Un Philosophe sous les toits;* Vigny, *Cinq-mars;* Zola, *Débâcle.* Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works of fiction, if approved by the instructor, may be read in the place of those given in this list.

C. *Classical French Literature.*—A study of the principal authors of the Seventeenth Century. The following texts will be read: Corneille, *le Cid, Horace;* Molière, *les Précieuses ridicules, le Bourgeois gentilhomme, l' Avare;* selections from

Descartes, Pascal, La Rochefoucauld and Bossuet in Warren's *French Prose of the Seventeenth Century;* Racine, *Andromaque, Athalie;* Boileau, *l'Art poétique;* La Fontaine, *Fables.* Lectures. Written reports. 2 hours. Given in alternate years: omitted in 1906-07.

D. *French Drama and Lyrical Verse of the Nineteenth Century.* In 1906-1907 the following works will be read: Victor Hugo, *Préface de Cromwell, Hernani, Ruy Blas;* Alfred de Musset, *Poésies et comédies;* Sainte-Beuve, *Selected Essays;* Dumas fils, *la Question d'argent;* Pailleron, *le Monde ou l'on s'ennuie;* Henri de Bornier, *la Fille de Roland;* Rostand, *Cyrano de Bergerac;* Canfield's *French Lyrics.* Lectures. Written reports. The outside reading will consist of parts of histories of French literature and of the writings of French literary critics. 2 hours. Open to students who have had Courses A and B.

E. *Comedies of Molière.*—The more important comedies of Molière will be read by the instructor. Lectures on Molière and his time. Students desiring this course must consult the instructor. 2 hours. PROFESSOR AHLERS.

I. *French Phonetics, and Colloquial French.*—Matzke's *Primer of French Pronunciation* (revised edition) and Kron's *French Daily Life* (Rippman). 1 hour.

Prerequisites, Courses A and B. Students who take Course C or Course D are advised to take Course I also.

J. *Nineteenth Century Fiction.* The members of this class will meet individually with the instructor. To each student will be assigned the more important works of fiction and the biographies of two or more writers. Written reports will be required. Not less than 5000 pages will be read. The final examination will cover not only the works read, but also the student's ability to read French prose with ease and accuracy. 2 hours. Prerequisites, Courses A, B, and C or D. Students desiring this course must consult the instructor.

H. *Old French.*—Old French grammar, with reading from Old French texts. 2 hours.

Prerequisites, French A, B, C or D, and I, and Latin A.

SPANISH LANGUAGE AND LITERATURE.

PROFESSOR HILLS.

A. *Elementary Course.*—Hills and Ford's *Spanish Grammar;* Ramsay's *Spanish Reader;* Valera, *El pájaro verde;* Echegaray, *Ó locura ó santidad.* Writing from dictation, and practice in conversation. 3 hours. Students are advised not to elect Spanish A and Italian A in the same year.

B. **Modern Literature of Spain and Spanish-America.*—First half-year: Selections from the prose writers of the Nineteenth Century. Second half-year: Ford's *Spanish Anthology;* Hill's *Bardos Cubanos.* 2 hours. Given in alternate years: omitted in 1906-07.

C. **Classical Spanish Literature.*—Padre Isla's version of *Gil Blas* (extracts); Cervantes, *Don Quijote* (extracts); Calderón, *La vida es sueño.*. Lectures and collateral reading. Open to students who have had Spanish A, or its equivalent. 2 hours. Given in 1906-07 and every alternate year.

For outside reading: Alarcón, *El escándalo, El final de Norma, El niño de la bola, El sombrero de tres picos;* "Caballero", *La familia de Alvareda;* Isaacs, *María;* Palacio Valdés, *La aldea perdida;* Pardo Bazán, *De mi tierra, Los pazos de Ulloa;* Pereda, *Don Gonzalo Gonzáles;* Pérez Galdós, *Doña Perfecta, Gloria* (2 vols.), *Mariancla, Electra;* Valera, *Doña Luz, Pepita Jiménez.* Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works of fiction, if approved by the instructor, may be read in the place of those given in this list.

D. *Contemporaneous Spanish Fiction.*—The members of this class will meet individually with the instructor. To each student will be assigned the more important works of fiction and the biographies of two or more writers. Written reports will be required. Not less than 4000 pages will be read. The final

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*NOTE.—In Courses B and C there are bi-weekly exercises in prose composition.

examination will cover not only the works read, but also the student's ability to read Spanish prose with ease and accuracy. 2 hours.

Prerequisites, Spanish A, and B or C. Students desiring this course must consult the instructor.

ITALIAN LANGUAGE AND LITERATURE.

PROFESSOR HILLS.

A. *Elementary Course.*—Grandgent's *Italian Grammar;* Bowen's *Italian Reader;* Goldoni, *Il vero amico;* Manzoni, *I promessi sposi.* 2 hours.

B. *Italian Literature of the Thirteenth and Fourteenth Centuries,* with an especial study of Petrarca and Dante. Lectures and collateral reading. 2 hours. Courses A and B are not given in the same year.

ECONOMICS.

PROFESSOR URDAHL.

A systematic course in the elements of Political Economy, required of Sophomores, is followed by elective courses in special subjects. Course A is a prerequisite to any of the electives except F.

A. *Elementary Economics.*—A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, followed by lectures and assigned reading on the general principles of consumption, production, exchange and distribution. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law or journalism, the general rules and principles contributed to business by the science of economics. First half-year, 2 hours.

B. **Charities and Corrections.*—This course embraces first, a series of lectures on the theory and history of charity and reformatory work; second, a study of the dependent class, with special reading on the slum conditions in our large American cities; third, the delinquent class, the causes and prevention of crime, prison management and discipline. Charitable and correctional institutions in the vicinity will be visited and special lectures will be given by men who have given special attention to some phase of these subjects. Second half-year, 3 hours.

C. **Money and Banking.*—The history and theory of money, credit and banking. The evolution of metallic currency. The position of the Bimetallists and the Quantity Theorists. Credit, credit instruments, paper money, convertible and inconvertible notes, modern currency problems and foreign banking systems are studied with special reference to American currency and banking. Lectures, recitations, reports and discussions. First half-year, 3 hours. Given in alternate years: omitted in 1906-07.

D. **Socialism.*—An historical and critical course in socialism and socialistic theory. Especial attention is paid to the historical basis of socialism, the French Revolution, the idealists, the German scientific socialists, the Christian socialists, the State socialism of today, and also to the various attempts at socialistic reforms. Lectures and recitations. First half-year, 3 hours. Given in alternate years: omitted in 1906-07.

E. **Colonial Policy.*—The theories of colonization and the economic ideas and institutions underlying the modern expansionist movement; a brief history of the colonial experiments of the great colonizing nations of the world: Spain, Portugal, Holland, France, England, Russia and Germany; a brief account of commercialism past and present, and of modern trade theories. Lectures and recitations supplemented by outside reading. First half-year, 2 hours.

F. *Economic and Social History of the United States.*—3 hours, Given in alternate years: omitted in 1906-07.

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*Prerequisite, Economics A.

G. **Public Finance.*—A survey of the whole field of public finance, including (*a.*) public revenues, their nature, classification and characteristics with special emphasis on taxation; (*b.*) public expenditures, their classification and relation to public welfare and to governmental functions; (*c.*) the budget and its preparation in the great countries of the world; (*d.*) public credit, its nature, employment, industrial effects and administration. Lectures, recitations and collateral reading in Adams', Seligman's and Ely's works. Second half-year, 3 hours.

H. **Seminary in Economics.*—Designed for graduates and undergraduates who have had sufficient preparation. After a brief survey of the theories of rents, wages and profits advanced by the classical economists, the more recent theories are studied with special reference to Marshall, Clark and Patten, McFarlane, Bohn-Bawerk, etc. Second half-year, 3 hours.

POLITICAL SCIENCE.

Professor Urdahl.

A. *Historical Politics.*—The origin and growth of government from its primitive forms to the establishment of the modern states, the semi-amorphous horde, gentile society, the ancient city, the Athenian Democracy, the Greek Confederations, the Roman Republic and Empire, the Germanic folk; the feudal system, the political system of the Church, the Holy Roman Empire, the rise of national states, the development of absolute and constitutional monarchy, the growth of democracy, etc. Lectures supplemented by recitations and reports. Text: Wilson's *State*. First half-year, 3 hours. Given in alternate years: omitted in 1906-07.

B. *Comparative Politics.*—A study and comparison of the governments of the chief modern States; an exposition of the constitutional law of the United States and England and of their actual political organization. The great problems of federalism and centralization, presidential and responsible ministerial

*Prerequisite, Economics A.

government, colonial government and civil liberty, receive especial consideration. Lectures, recitations and collateral reading. Second half-year, 3 hours. Given in alternate years: omitted in 1906-07.

HISTORY.*

PROFESSOR URDAHL.

A. *English History.*—The political history of England from the earliest times to the American Revolution. Recitations and collateral reading, supplemented by lectures on the constitutional and economic development. Required of Sophomores. 2 hours.

B. *American History.*—A general survey, with emphasis on political and economic history. Course A is recommended as a preparation. In special cases the course may be elected for one half-year. 3 hours.

(*a.*) First half-year: To the close of the Revolution.

(*b.*) Second half-year: From the Revolution to the present time.

D. *Modern History to the French Revolution.*—History D and C constitute one continuous course. First half-year, 2 hours. Given in alternate years: omitted in 1906-07.

C. *The Napoleonic Era and Modern Times.*—The history of Western Europe in the nineteenth century. Second half-year, 2 hours. Given in alternate years: omitted in 1906-07.

E. *Mediaeval History.*—A survey of the general history of Continental Europe through the period which lies between Ancient and Modern history. 2 hours. Given in 1906-07 and every alternate year.

G. *Seminary in American History.*

For 1906-07 a special study will be made of the period

*For courses in Greek and Roman History, see Greek H and Latin I. History A is a prerequisite to all history courses except Greek H and Latin I.

1840-1861. This work is a continuation of the investigation of the period 1830-1850 carried on by the class in 1905-06 and of the period 1815-1830 covered in 1904-05. A special study will be made of the following topics: (*a.*) The sub-treasury, the banks and the panic of 1839; (*b.*) The annexation of Texas, its consequences, and constitutional aspect; (*c.*) The abolition movement, slavery in the territories and slavery in its relation to international law; (*d.*) The compromise of 1850, its consequences and the Dred Scott decision; (*e.*) The secession movement and coercion. (*f.*) Abraham Lincoln and his party; (*g.*) The tariff, internal improvements, railroads, etc.

Open to graduates and undergraduates of sufficient preparation. The students are expected to exhaust the material within reach in all the local libraries. 3 hours.

LAW.

PROFESSOR URDAHL, MR. BABBITT, MR. HALL, MR. MCALLISTER, MR. WILLCOX.

The courses in Law are the equivalent of, and secure credit for, one year's work in the principal law schools of the country. The work has been arranged with a view to meeting the wants of students who, not intending to practice law, nevertheless desire a thorough foundation in the general principles on which Anglo-Saxon jurisprudence is based, as well as of those who intend to complete their studies and enter upon the practice of the profession.

A. *Elementary Law.*—A general view of the whole field of law and an introduction to its terminology and fundamental ideas. In addition to a careful study of a standard text-book the student is required to do collateral reading in Blackstone's and Kent's commentaries. First half-year, 3 hours.—PROFESSOR URDAHL.

B. *American Constitutional Law.*—The general principles of constitutional law of the United States, their interpretation and practical application; the origin and development of the written constitution in America. Recitations and lectures sup-

plemented by a study of the leading cases on constitutional law. Second half-year, 3 hours.—PROFESSOR URDAHL.

C. *Contracts.*—Mutual assent and the necessity of its communication; offers and their expiration or revocation; necessity of consideration; requisites of contracts under seal; rights of beneficiaries and assignees; joint and several contracts; alternative contracts; conditional contracts; illegality; impossibility; duress; discharge of contracts, or causes of action arising under them by recession, novation, accord and satisfaction, release and other means. Texts: Anson on Contracts; Longwell's and Williston's Cases on Contracts. 2 hours. Given in alternate years: omitted in 1906-07.—MR. HENRY MCALLISTER, JR.

D. *Torts.*—The nature of torts; historical development; principles of liability; limitation of personal capacity; effect of a party's death; liability for the torts of agents and servants; general exceptions, inevitable accident, leave and license, necessity and self-defense; remedies; assault and battery; imprisonment; the family and business relation; defamation; wrongs of fraud and malice; wrongs to possession and property; trespass, waste, conversion, justification and excuse; nuisance; negligence, contributory negligence; special relations of contract and tort. Texts: Webb's Pollock on Torts; Ames and Smith's Cases on Torts. 2 hours. Given in 1906-07 and every alternate year.—MR. O. B. WILLCOX.

E. *Domestic Relations and the Law of Persons.*—Infancy: period of infancy; voidable acts, disaffirmance, ratification; contracts for necessaries; obligations created or authorized by law; liability for tort; guardian and ward. Marriage: promise to marry; marriage contract at common law and under statutes; rights of husband and wife in each other's property; status of married women; transactions between husband and wife; torts affecting marital relations; separation; divorce. Parent and child: custody, service and earnings. Texts: Tiffany on Domestic Relations, Woodruff's Cases on Domestic Relations. 2 hours. Given in alternate years: omitted in 1906-07.—MR. K. R. BABBITT.

F. *Property.*—Real and personal property; ownership of land; nat-

ural servitudes; easements; covenants as to use; public rights; franchises; rents, tenures; uses and trusts; joint ownership; estates; remainders, executory limitations; common law assurances and conveyances under the Statute of Uses. Texts: 207 to 508, Chase's Blackstone; Gray's Cases on Property, 2 hours. Given in 1906-07 and every alternate year.—Mr. Henry C. Hall.

G. *Mining Law.*—The mining laws of foreign countries; the policy of the United States, and Federal legislation concerning mineral lands; lands in the United States subject to appropriation under the mining laws, and the persons who may acquire rights therein; state legislation and local district regulations supplementing the Federal laws; the vein, apex, dip; the discovery, location and record of lode and placer claims; tunnel claims; coal lands, salines, mill sites; the nature and extent of property rights acquired by lode and placer locations; cross lodes, the extra-lateral right, known lodes; annual labor, abandonment, forfeiture, resumption of work, relocation; proceedings to obtain U. S. Patent, the adverse claim, action to determine adverse claims, the patent; actions and remedies; rights and obligations arising out of agreement between the parties. Texts: Lindley on Mines and selected cases. 1 hour. Given in alternate years: omitted in 1906-07. —Mr. O. B. Willcox.

MATHEMATICS.

Professor Cajori, Professor Loud and Miss Hubbard.

A. (*1.*) *Algebra.*—Series; The Binomial Theorem; Logarithms. Undetermined Coefficients; Theory of Equations. 4 hours till January.

A. (*2*) *Solid and Spherical Geometry.*—Planes and lines in Space; Polyhedra, the Cylinder, Cone and Sphere; Spherical Triangles. Second half-year, 2 hours.

A. (*3.*) *Plane Trigonometry.*—The functions of one and two angles; the solution of triangles; simple applications. 4 hours during January. Second half-year, 2 hours.

A. (4) *Spherical Trigonometry.*—Second half-year, 2 hours.

B. (1) *Analytical Geometry (Elementary).*—Plane Loci of first and second order. First half-year, 3 hours.

B. (2) *Analytical Geometry (More Advanced).*—More thorough study of plane loci, some attention being given to modern methods. Second half-year, 3 hours.

C. *Calculus, Differential and Integral.*—First half-year, 3 hours. Second half-year, 4 hours.

D. *History and Logic of Mathematics.*—This course is planned especially for those who are fitting themselves to be teachers of Mathematics. One half-year, 2 hours.

E. **Modern Methods in Geometry.*—One half-year, 3 hours.

F. **Theory of Equations.*—One half-year, 3 hours.

H. **Determinants.*—One half-year, 2 hours.

J. *Theoretical Mechanics.*—Prerequisite, course C. This course is intended especially for students of engineering and mathematical physics. 4 hours.

I. *Elementary Surveying.*—Field work and computation. Fee, $4. Second half-year: 8 hours, field work; 2 hours, recitation: counts 3 hours.

ASTRONOMY.

PROFESSOR LOUD.

A. *Elementary Astronomy.*—The descriptive, rather than the mathematical side of Astronomy, is emphasized. Text: Young's *Manual of Astronomy.* Essays are required. Second half-year, 3 hours.

B. *Observations and Computations.*—Prerequisite, Mathematics A (3). Astronomy A is recommended in preparation. The student is expected to make free use of the telescope and transit instruments, and to use his observations in the solu-

*Of Courses E, F, and H only one is given in any one year.

tion of simple problems. First half-year, 3 hours (including the observatory work counted as laboratory periods).

C. *Celestial Mechanics.*—The work of Moulton is used as a text-book. Prerequisite, Differential and Integral Calculus. First half-year or throughout the year, 2 hours.

D. *Elementary Meteorology.*—Prerequisite, Elementary Physics. Text: Davis' *Elementary Meteorology.* Second half-year, 3 hours.

E. *Field Astronomy for Engineers.*—Comstock's work of this title is used as a text. First half-year, 3 hours.

F. *Stellar Photography.*—For this course the instruments of the Western Association for Stellar Photography,* at the station near Colorado Springs, are available. One half-year.

PHYSICS.

Professor Shedd.

The aim of the courses offered in this department is: (I.) To give an elementary knowledge of the fundamental principles of the subjects studied. To this class belong courses A, B, and H. (II.) To give a working knowledge to those expecting to teach. For this purpose there are offered, on the theoretical side, courses C and G; on the experimental side, course D. (III.) To meet the needs of the student of pure science. To this class belong courses E and K.

A. *General Physics* for candidates for the A. B. degree. Credit, 3 or 4 hours.

(1) Three lectures and one recitation per week. In these lectures the experimental and historical development of the subject will be emphasized. No mathematics is required beyond that necessary for entrance to College.

(2) Collateral reading or laboratory work. Those taking this course as the Science requirement will be assigned laboratory work, one period of two hours per week.

B. *General Physics* for candidates for the A.B. degree. Credit, 4 hours.

*See p. 104.

(1) Three lectures and one recitation per week. In these lectures the mathematical development of the subject will be emphasized. A knowledge of plane trigonometry is prerequisite to the course.

(2) Two periods of two hours each of laboratory work.
First half-year: Mechanics, Heat, Sound.
Second half-year: Light, Magnetism, Electricity.

(Those preparing to teach are advised to take this course.)

H. *General Physics* for candidates for the S. B. degree. This course is similar to course B, excepting that the experiments are selected especially for engineering students. Credit, 4 hours.

G. *Problem Work.*—Open to students who have taken or are taking A, B, or H. Credit, 1 or 2 hours.

C. *Theoretical Physics.*—Credit, 2 hours.

First half-year.—Light, including geometrical and physical Optics, or theory of Heat.

Second half-year.—Theory of Alternating Currents, or Electricity and Magnetism.

D. *Practical Physics.—Experiments in Mechanics*: Study of the balance; Borda, Kater and Foucault Pendulums; elastic modulus by various methods; viscosity of liquids, soap films and Plateau figures; comparison of scales by comparator; hydrostatic pressures.

Experiments in Heat.—Calibration of thermometers by double points of H_2O and of other compounds; heat-equivalents of liquefaction and vaporization; relation of viscosity to temperature.

Experiments in Sound.—Vibration of wires; longitudinal waves; resonance of forks and air columns; Lissajous' and Meld's experiments.

Experiments in Optics.—Measurements of constants of mirrors; cardinal points of lenses; photometric measurements with Bunsen and Lummer-Brodhun photometers; study of the eye and its defects; study of diffraction patterns; spectrometer and interferometer work.

Experiments in Electricity and Magnetism.— Study of the Earth's field; temperature variations of magnets; wireless signals; X-ray work with the static machine, induction coil and Tesla coil; electrodynamic laws.

The credit in any of these subjects will depend upon the time spent in the laboratory, 2 hours a week counting as 1 hour.

E. *Advanced Physics.*—Lectures on Physical Constants and Instruments of Precision and on the Magnetic Circuit. Collateral reading and papers on assigned subjects. Credit, 2 hours.

K. *Precise Measurements in Electricity and Magnetism.*—I, E, and Q constants of galvanometers. Value of H of Earth's field. H, B curves for iron. Hysteresis loop, Comparison of E. M. F.'s, Measurement of Resistance, Capacity and Inductance. 4 hours' laboratory work per week. Credit, 2 hours.

NOTE.—Course A or B is a prerequisite for Courses C and D. Course B or H and a knowledge of the calculus are prerequisites for Courses E and K. In all laboratory courses a fee of $2.00 is charged for each credit of one hour for a half-year. In Courses A, B and H there is a laboratory-book fee of 25c each half-year.

CHEMISTRY.

PROFESSOR STRIEBY AND PROFESSOR CRABTREE.

A. *Elementary Chemistry.*—Text-book work (chiefly Inorganic Chemistry) supplemented by lectures and discussions upon the fundamental laws, the application of chemistry to sanitary science, medicine and some of the arts, and also by occasional papers from descriptions in technical books, and by reports of visits to metallurgical and manufacturing establishments. Remsen's *College Chemistry.* 3 hours' recitation and 4 hours' laboratory work (counts 3 hours).

B. *Advanced Chemistry.*—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The prac-

tical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. 3 hours' recitation or lectures and 4 hours of laboratory work (counts 3 hours).

C. *Qualitative Analysis.*—Prerequisite, Chemistry A or equivalent. Experimental drill in obtaining characteristic reactions of the more common elements, study of empirical formulæ and symbolic expression of reactions, solution of substances, separation of groups of elements, and finally analysis—first of simple salts and later of complex mixtures. The analytical work is confined almost wholly to inorganic substances, but includes certain common organic acids and a few organic bodies of general and medicinal use. 9 hours (counts 4).

D. *Quantitative Analysis.*—Prerequisite, Chemistry C. The laboratory work comprises determinations of single elements by approved methods, gravimetric and volumetric, followed by the analysis of selected salts, ores, slags, mineral water and commercial products. A few rapid or commercial determinations are given as the final work. The lectures treat of the methods of analysis, properties of precipitates, stoichiometry, sampling, reporting and the theory of solutions. The laboratory work occupies 3 consecutive hours 4 days a week (counts 4 hours). Cairn's *Quantitative Analysis.*

E. *Organic Chemistry.*—Prerequisite, Chemistry A or B. Remsen's *Organic Chemistry.* Lectures and discussions of special subjects and processes. 3 hours' recitation and 3 hours' laboratory work (counts 3 hours).

F. *Theoretical Chemistry.*—Prerequisite, Chemistry B. Text-book work with lectures and oral and written discussions. 3 hours.

G. *Medical Chemistry.*—Prerequisite, Chemistry B. Lectures, text-book, assigned reading and laboratory work. The study is

mainly of substances, inorganic and organic, that are of importance in medical science and hygiene. Especial attention is devoted to the analysis of urine, water, milk, metallic poisons, and the use of disinfectants. The needful gravimetric determinations, considerable volumetric work with burettes and standard solutions, and microscopic and spectroscopic tests, supplement the usual qualitative examinations. 4 hours' recitation, 4 hours' laboratory work (counts 4 hours).

H. *Agricultural Chemistry.*—Prerequisite, Chemistry B. A study of soils, fertilizers, foods and feeding; the analysis of soils, manures, water and dairy products. 3 hours.

The fee for every course must be paid in advance. It covers the cost of gas, chemicals and non-returnable supplies, except platinum. Glassware and necessary apparatus (except platinum vessels) are loaned to the student and must be returned in good condition. The fees are as follows:

Course A	$7 00
Course B	8 00
Courses C and D, each year's work	15 00
Courses E and G, each	15 00

BIOLOGY.

Professor Schneider.

A. *General Biology.*—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution. First half-year: Laboratory study of typical green flowering plants, with special reference to the structure and function of their various organs; a comparative study of cryptogams, beginning with the simplest forms. Second half-year: Careful dissection of the frog and microscopic study of some of the more important organs; some of the simpler forms of animals. Recitations, lectures, and laboratory work. 6 hours (counts 3 hours).

B. *Zoology.*—Prerequisite, Biology A. Lectures and recitations on the History of Zoology, Systematic Zoology, Morphology, and Embryology. Dissection of various classes and orders of animals up to chordata, with careful microscopic study of the finer structures. 6 hours (counts 3 hours).

C. *Physiology.*—Prerequisites, Biology A and Chemistry. Lectures, recitations and practical work by the student. The experimental work covers the following subjects: The physiology of ciliary motion; the general physiology of muscle and nerve tissue; phenomena of circulation, with countings of the blood-corpuscles and estimation of hæmoglobin; respiratory exchanges, movements, etc.; digestion and absorption; physiology of the spinal cord and brain; of the cutaneous sensations, taste, smell, hearing and vision. Some time is also given to lectures, with demonstrations, on the physiological action of the more important poisons. 6 hours (counts 3 hours).

D.** *Comparative Anatomy of Vertebrates.*—Prerequisite, Biology A. Careful dissection of the Amphioxus, Cyclostome, Fish, Amphibian, Reptile and Bird. Lectures, collateral reading, and recitations. First half-year, 6 hours (counts 3 hours).

E.** *Mammalian Anatomy.*—Prerequisite, Biology A. The work is based upon a detailed dissection of the cat. Other material is used to illustrate the anatomy of special organs. Lectures and collateral reading. Second half-year, 6 hours (counts 3 hours).

F.* *Histology.*—Prerequisite, Biology A. A comparative detailed study of the tissues of the higher animals. Preparations of the principal tissues and organs are made and the common methods of preparation and mounting studied. Special microscopic drill is given in distinguishing the different tissues and organs. First half-year, 6 hours (counts 3 hours).

G.* *Embryology and Cytology.*—Prerequisite, Biology F. A study of maturation, fertilization and cleavage of the ovum, early stages of the embryology of the chick and frog. Special attention is given to the differentiation and development of tissues and organs. Students make most of their own preparations. Second half-year, 6 hours (counts 3 hours).

**Courses D, E and H will be offered in 1906-1907 and alternate years.

*Courses F, G, J and K will be offered in 1907-08 and alternate years.

H.** *Bacteriology.*—Prerequisite, Biology A. Apparatus; culture media and methods of preparation; sterilization methods; microscopic characteristics of cultures of bacteria in general and of special forms and methods of diagnosis; methods of obtaining pure cultures; methods of staining; bacteriological investigations of water, air, and soil. Students electing this course are expected to take Biology I. 5 hours (counts 2 hours).

I. *Sanitary Science and Public Health.*—A lecture course. Some of the topics discussed are: Death and its causes; classification of diseases; ancient and modern theories of diseases; germ theory of infectious disease; direct causes and predisposing causes of disease; means of avoiding and resisting disease; vehicles of disease, such as dust, sewage, water, etc.; brief sketch of the important transmissible and epidemic diseases, prophylaxis, etc. 1 hour.

J.* *Plant Physiology.*—Prerequisites, Biology A and Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First half-year, 5 hours (counts 2 hours).

K.* *Systematic Botany—Seed Plants.*—Prerequisite, Biology A, Lectures on the principles of classification. A study of local flora is made, including the collection and determination of flowering plants. Some time is devoted to a study of the structural adaptations of plants to their surroundings. Second half-year, 3 hours.

LABORATORY FEES: Courses E and K, each, $2.00; Course A, $2.50; Courses D, F, G and J, each, $3.00; B, C, H, each, $4.00.

**Courses D, E and H will be offered in 1906-07 and alternate years.

*Courses F, G, J and K will be offered in 1907-08 and alternate years.

GEOLOGY.

Professor Finlay.

A. *General Geology.*—Prerequisite, Elementary Chemistry. Dynamical, Structural and Historical Geology. Lectures, required reading and required field excursions on Wednesday afternoons until Thanksgiving. The student, while not required to do so, is advised to elect Mineralogy and Zoology before taking Geology, or at the same time with it. Texts: Chamberlin and Salisbury's *Geology,* Scott's *Introduction to Geology.* 3 hours.

B *Mineralogy.*—Prerequisite, Elementary Chemistry. Required for Courses E and H. The economic or ore classification of minerals is used and the time is devoted chiefly to laboratory work in Descriptive and Determinative Mineralogy. Text: Moses and Parson's *Mineralogy, Crystallography and Blowpipe Analysis.* Laboratory fee, three dollars. Uniform individual working outfits are furnished at cost. 6 hours (counts 3 hours).

E. *Economic Geology.*—Prerequisites, Geology and Mineralogy. Lectures and required reading. The geology and mineralogy of the ore deposits of the United States, gold, silver, copper, lead, zinc, iron. The greater part of the second half-year is devoted to the consideration of coal, building stones, and the less important non-metallic minerals. In the spring there are voluntary field excursions to mining localities. Texts: Kemp's *Ore Deposits of the United States and Canada,* Kemp's *Economic Geology of the Non-metallic Minerals.* 3 hours.

F. *Invertebrate Paleontology.*—Lectures and laboratory work. Systematic study of the chief classes of the invertebrates by means of fossils, with special attention to the structure and development of the trilobites and brachiopods. Collections are made in the field to afford training in the identification of geological horizons. First half-year, 3 hours. Given in 1906-07 and every alternate year.

G. *Vertebrate Paleontology.*—Lectures, laboratory work on the museum collections and required reading on the main lines of mammalian descent from the Eocene to recent time. First half-year, 3 hours. Given in alternate years: omitted in 1906-07.

H. *Petrography.*—Prerequisite, Courses A and B. Lectures and laboratory work with the microscope on the commoner rock-forming minerals and the principal rock types. Second half-year, 3 hours.

I. *Field Geology.*—The systematic investigation in the field of 150 square miles immediately adjacent to Colorado Springs with the preparation of maps and a report. Individual work under the guidance of the instructor.

BIBLE STUDY.

PROFESSOR PARSONS.

The following courses are offered in successive years:

I. Introduction to the Books of the New Testament.
II. The Life of Christ (2 years).
III. Old Testament Literature.
IV. The Life of Paul.

In 1906-07 the class will study Course III.

The class meets two hours a week.

MUSIC.

For courses in Music see pages 92-93. Course A only is counted towards a degree. Courses in Music are not included in the regular tuition fee.

Students of Music register with the Dean of the School of Music.

Honors and Scholarships Awarded at Commencement, 1905

HIGH HONORS.

Philip Fitch, '06.
Jean Rose Ingersoll, '05.
Alice Isabel Kidder, '06.
Harold DeWitt Roberts, '08.
Laura Stiles, '05.

HONORS.

Jean Muriel Auld, '08.
Lola May Davis, '05.
Violet Louise Holcomb, '06.
Mary Card Porter, '05.
Orrie Wood Stewart, '06.

PERKINS SCHOLARS.

Montgomery Smith, '07.
Mabel Sylinda Bateman, '07.

C. C. HEMMING SCHOLAR.

Philip Fitch, '06.

MARY G. SLOCUM SCHOLAR.

Leo Williams Bortree, '06.

HASTINGS PRIZES.

1. Maurice Crowther Hall.
2. William Bryant Harman.

The Master's Degree

The Master's degree is conferred subject to the following conditions:

(1) The applicant must have received the Bachelor's degree from some reputable college or university.

(2) If the applicant becomes a resident student of Colorado College, he must pursue a minimum course of nine hours of advanced work a week for one year. The work shall include both a major and a minor subject, and at least five hours a week shall be taken in the major subject. In addition, the applicant must present a satisfactory thesis on a subject approved by the Faculty, such thesis to represent the equivalent of at least three hours of lectures a week for one year.

(3) In case of non-residence, the applicant must select a major and a minor subject, and complete a minimum requirement equivalent to twelve hours of lectures a week for one year, of which the equivalent of seven hours must be in the major subject, and at least two academic years must elapse before the degree is conferred. A thesis is required, as in the case of the resident student.

The thesis must be presented to the Faculty not later than May 15. It must be typewritten on paper of a prescribed size, and a copy deposited with the College librarian.

The last date of registration for post-graduate students is October 15.

The fees are $20 a year for tuition, $5 for the diploma, and $1 to bind the thesis.

Applications for the Master's degree should be sent to the Chairman of the Faculty Committee on Post-Graduate Degrees, who will furnish information about courses.

School of Engineering

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.,
President

FLORIAN CAJORI, Ph. D.,
Dean and Head Professor of Mathematics.

LOUIS A. E. AHLERS, A. M.,
Head Professor of the Germanic Languages and Literatures.

J. ROY ARMSTRONG, B. S.,
Assistant Professor of Electrical Engineering.

CHARLES G. COLLAIS,
Superintendent of Mechanical Laboratories.

FRED CRABTREE, B. S.,
Professor of Mining and Metallurgy.

GEORGE IRVING FINLAY, Ph. D.,
Professor of Geology, Mineralogy and Paleontology.

ELIJAH CLARENCE HILLS, A. B.,
Head Professor of the Romance Languages and Literatures.

FRANK HERBERT LOUD, Ph. D.,
Professor of Mathematics and Astronomy.

GEORGE J. LYON, C. E.,
Professor of Civil Engineering.

HOWARD MOORE, C. E.,
Instructor in Graphics.

SIDNEY F. PATTISON, A. B.,
Assistant Professor of English.

JOHN CUTLER SHEDD, PH. D.,
Professor of Physics.

WILLIAM STRIEBY, A. M., E. M.,
Professor of Chemistry and Metallurgy.

ORGANIZATION OF THE SCHOOL.

The present rapid development of Colorado and the West created so imperative a demand for instruction in pure and applied science that the Trustees of Colorado College, at a meeting held on Dec. 26, 1902, decided to add to the existing departments of the institution a School of Engineering. Colorado Springs is admirably situated for such a school. The suburban electric railway takes the student to three different plants for the reduction of ore; the mines of Cripple Creek and the metallurgical works of Pueblo are near by; there are in the neighborhood fine examples of mountain railway construction and large electric plants with machinery of modern type. The Hydro-Electric Company has now completed its power plant near Manitou, in utilization of what is the highest head ever developed in hydraulic engineering. By careful study of local engineering problems and by close contact with the engineering establishments of this vicinity, it will be possible to secure a thorough blending of theoretical and practical instruction.

REQUIREMENTS FOR ADMISSION.

(16 units.)

The requirements for admission to the engineering courses are as follows:

1. Mathematics (3 units)—(*a.*) Algebra through simultaneous quadratic equations; (*b.*) Elementary Plane Geometry; (*c.*) Solid and Spherical Geometry; (*d.*) Review Algebra, Ratio and Proportion, Binomial Theorem, Arithmetical and Geometrical Progression, Elements of Permutations and Combinations. Plane Trigonometry is desirable, but not necessary. A thorough preparation is of great importance.

2. Physics (1 unit)—One year's course. See p. 21.

3. Chemistry (1 unit)—One year's course. See p. 21.

4. Biology (1 unit)—One year's course. In place of Biology may be substituted an equivalent amount of Botany, Physiology, Physiography, or Geology, any two of these to be counted the equivalent of Biology. See p. 22.

5. English (3 units)—As in the College of Liberal Arts. See p. 19.

6. Foreign Languages (2 units)—Two years. See pp. 20-21.

7. American and English or Ancient History (2 units)—One year's course in each. See p. 19.

8. Electives (3 units)—Preferably in modern languages. See p. 18.

DEGREE.

At the completion of an engineering course the student will receive the degree of Bachelor of Science, with a specific designation of the engineering course taken.

THESIS.

Each student will be required to present, before graduation, a thesis on some engineering subject embodying investigations of his own.

SUMMER MEMOIR.

A description of some engineering work, containing from three to five thousand words, is required of all students of the Engineering School at the beginning of the third and fourth college years.

THE PIKE'S PEAK POLYTECHNIC SOCIETY.

The Pike's Peak Polytechnic Society, organized in 1904, has a large membership, composed of engineers of the Pike's Peak region. Its meetings are held in the Coburn Library and the members have access to the engineering library of the College. Students of the School of Engineering are associate members of the society and at its meetings enjoy the privilege of personal contact with prominent engineers.

ENGINEERING LIBRARY.

Since the opening of the Engineering School a considerable library of technology has been accumulated. The first acquisition

consisted of the private library of the late Professor R. S. Miller of Purdue University, which is particularly strong along the lines of mechanical engineering. This year a large number of new engineering books has been purchased, and books are now placed on the shelves for reference by members of the Pike's Peak Polytechnic Society. A considerable number of technical journals has been secured. The library has now a complete set of the Engineering Record (formerly called the Sanitary Engineer), of the Mineral Industry, and of the Van Nostrand's Engineering Magazine, Scientific American, and nearly a complete set of the Scientific American Supplement. It has ninety-five volumes of the Minutes of the Institution of Civil Engineers of Great Britain, and the recent volumes of the Engineering Magazine, Cassier's Magazine, Engineering News, Engineering and Mining Journal, Electrical World, Electrical Engineer, Electrical World and Engineer, Electrician (London), Technology Quarterly, Municipal Engineering, American Machinist, Journal of the Franklin Institute. It has the current numbers of Ores and Metals, Mining Industry, Chemical News, Journal of the American Chemical Society and Fresenius Zeitschrift. It has the recent transactions of the American Institute of Mining Engineers, American Institute of Electrical Engineers, American Society of Civil Engineers, the American Society of Mechanical Engineers. The library has the reports of the (Colorado) State Engineer, as well as the reports of the United States Geological Survey, United States Coast Survey, United States Chief Engineer, United States Chief of Ordnance, and the United States Publications on Irrigation. Over twenty other engineering journals are taken by the Pike's Peak Polytechnic Society, to which the faculty and engineering students have free access. Altogether the list of journals within reach of the students is large. Some important engineering books and journals have been received as donations. Captain L. E. Berthoud, of Golden, Henry Hine and George C. Hewett, of Colorado Springs, gave several volumes; Mr. M. Kirkman, of Chicago, gave a complete set of his "Science of Railways"; Mr. John Herron, of Telluride, gave fourteen volumes of the Transactions of the American Society of Civil Engineers and six volumes of the Journal of the Association of Engineering Societies. Mr. B. H. Bryant has loaned the College, for the use of the Engineering School and the Pike's Peak Polytechnic Society, twenty-six volumes of the Engineering News,

twelve volumes of the Railroad Gazette and other publications, amounting to over one hundred volumes. Mrs. Walter B. Wilson donated Hayden's Atlas and other works. From the Armour Institute the library received a complete set of Modern Engineering Practice.

LABORATORIES AND EQUIPMENT.

The Physical Laboratory. See p. 102.

The Chemical Laboratory. See p. 103.

The Mechanical Laboratories.—It is desirable that engineering students should acquire some practical knowledge in carpentry, wood turning, pattern-making, blacksmithing, tool-making, machinists' bench and vise work, and in the handling of machine tools. To carry on this work there have been fitted out three laboratories, supplied with heat and electric light.

1. *Wood Laboratory.*—This is equipped with heavy maple-top cabinet benches, each having a tool cabinet furnished with the best make of tools, comprising Bailey planes, Buck Brothers' chisels, Disston saws, etc. The pattern-making department is equipped with six wood-turning lathes, a 32-inch band saw, a table saw, hand saws, planes, clamps, hand screws and tool-sharpening machinery.

2. *Forging Laboratory.*—This is furnished with Buffalo iron blast forges, connected with Sturtevant blast and suction fans, anvils, swage blocks, tools, benches, vises, lockers, etc.

3. *Iron Laboratory.* — This is equipped with machinists' benches, bulldog vises, and drawers containing individual sets of tools; also with two Bradford engine lathes, an E. E. Ried screw-cutting lathe, a shaper, a Cincinnati universal milling machine with various attachments including a dividing head, a large and small drillpress, emery grinder, machine hacksaw, and grinding machinery. Several different kinds of micrometers, face plate for finishing surfaces, and large steel ma-

chinists' rules, etc., are useful in advanced work. As need arises other equipment will be added to this and the other mechanical laboratories. The power in the mechanical laboratories is supplied by a 20-h. p. Chandler and Taylor engine.

The Testing Laboratory.—For experiments upon the materials of construction a 100,000-pound Riehle testing machine is available, with the necessary accessories for making tensile, compressive and transverse tests. This machine is used by each student to make a series of tests upon the resisting properties of wood, brick, concrete, stone, wrought iron, cast iron and steel.

The Cement Testing Laboratory is equipped with a Fairbanks testing machine, sand and cement sieves, briquette moulds, Gilmore's needles, as well as the necessary tanks and other apparatus requisite for investigations in the nature and physical properties of cement and cement mortars. All students are required to make and test briquettes of cement and cement mortar as well as to determine the weight, fineness and other physical properties of such cement, sand, and mortar as may be assigned to them for examination.

The Hydraulic Laboratory, furnished with an ample supply of water, is available to supplement with practical exercises the courses in theoretical hydraulics. It is about to be equipped with a tank arranged as a channel, across which weirs of different shapes and sizes may be placed and in which orifices may be arranged for the purpose of determining hydraulic constants; with apparatus for experiments in connection with the flow of water through pipes; with several types of water meters including a Venturi meter; with pressure gages, differential gages, thermometers, etc., as well as with the portable tanks and scales usually found in such laboratories. A Hug water motor is also available for experimentation.

The Assay Laboratory is equipped with twenty-two muffle furnaces for solid fuel, and crucible and muffle furnaces for gasoline; also a large furnace of reverberatory type for handling a large number of fusions at one time; ore bins, fuel bins, two

power crushers, steel sampling floor and table; twelve new pulp balances and several button balances, including two of the highest grade made by Ainsworth, of Denver. It is also supplied with a large number of checked ore samples of various grades and kinds, many of them donated by the American Smelting and Refining Company, the Ohio and Colorado Smelting and Refining Company, the United States Reduction and Refining Company, the Portland Mining and Milling Company, the Elkton Mining Company, Mr. E. C. Woodward and others.

The Metallurgical Laboratory equipment includes a reverberatory furnace for roasting and smelting experiments, a set of iron kettles for desilverizing base bullion, tanks for cyanide and lixiviation tests of gold and silver ores, a grinding and amalgamation pan, apparatus for microscopical study of metals, and pyrometers and furnaces for fusibility and heat treatment experiments.

The Mining (Ore-Dressing) Laboratory contains a Dodge Crusher, sample grinder, crushing rolls, screens, jig, hydraulic classifiers, a Wilfley concentrating table, etc.

The Electrical Laboratory.—Besides the apparatus in the Physical Laboratory proper, the College has the following equipment for electrical engineering: Western Union test set, portable test box, model K test set, Whitney test set, four box bridges, Rowland D'Arsonval galvanometer, four Wall D'Arsonval galvanometers, ballistic galvanometer, eight-coil astatic galvanometer, four-coil Green astatic galvanometers, two Thomson controlling magnet galvanometers, dial faradmeter, universal ohmmeter and faradmeter, three Ayrton universal shunt boxes, Cardew hot wire volt meter, two Thomson inclined coil voltmeters, three Thomson inclined coil ammeters, three Thomson inclined coil wattmeters, two Weston direct current voltmeters, three Weston direct current ammeters, Weston standard laboratory voltmeter, Weston milli-voltmeter, Weston mil-ammeter, Weston direct current wattmeter, Weston volt-ammeter, Hopkinson's yoke permeameter, Rowland magnetizing ring, two fixed standards of self induction, bridge

for determining small inductances, standard of induction with secondary, resistance thermometer, three-meter cptical bench with Lummer's Brodhun screen, secohmmeter, four electro-dynamometers, wattmeter dynamometer, four torsional voltmeters and volt boxes, a Thomson-Rice arc ammeter, a National potential indicator, a stand ammeter, a Thomson-Houston ground detector, a Westinghouse ammeter, a Westinghouse voltmeter, an Edison ammeter, a Westinghouse compensator, a General Electric lightning arrester, two Shallenberger wattmeters.

Direct current dynamos are represented by two 15 k. w. General Electric direct-connected 110 volt generators, one 30 k. w. General Electric direct-connected 110 volt generator. These three generators are connected with a switch-board allowing the study of single and parallel operation. One 2 k. w. La Roche Ideal exciter generator, one 10 light 110 volt Fidelity generator, ½ h. p. H. J. Evans Special D. C. generator.

Direct current motors are represented by the following machines: Two 15 h. p. Sprague street car 500 volt motors (presented by the Rapid Transit Company of Colorado Springs), ½ h. p. 14 pole Ft. Wayne-Wood motor, ½ h. p. Excelsior arc-motor, 52 volt Emerson motor, 25 h. p. General Electric 110 volt motor, 15 h. p. Thomson-Houston 110 volt motor, small Westinghouse fan motor and 2 h. p. Lundell motor.

Alternating current machinery is represented by a La Roche arc and two special alternators, 125 cycles 25 k. w. 2000 volts or 60 cycles 15 k. w. 1000 volts (the armature is composed of two parts such that a mechanical displacement of phase from 0 to 90 degrees may be obtained), small A. C. Wagner induction motor, small General Electric induction hand start motor, two ½ h. p. Emerson induction fan motors, 1½ k. w. 60 cycle Maloney transformer (presented by the Maloney Transformer Co. of St. Louis), ten-light Stanley, Type C transformer. A 25 h. p. oil engine and 15 k. w. 220 volt generator have been donated to this department by General Palmer.

The Photometric Laboratory is equipped with a three-meter photo-

meter bench and Lummer Brodhum screen. Measurements of horizontal and spherical candle power as well as comparisons of lamps with standard lamps can be made.

Complete calibration and curve tracing tables will be installed during the year. The first will enable the student to calibrate all kinds of instruments accurately while the second will give him a thorough knowledge of alternating current and voltage relation under different loads.

The Experimental Engineering Laboratory has one horizontal and three vertical steam engines, four boilers, boiler feed pumps, auxiliary apparatus of the power plant, ventilating fans, hoisting blocks, etc., for making various commercial mechanical tests such as boiler pressure tests, efficiency tests of all kinds, steam indicator diagrams and valve settings of engines.

Surveying.—The school possesses a good working equipment of engineers' field instruments, including transits, levels, a solar attachment and a plane table, as well as smaller instruments and accessories. Each student is required to adjust and learn to use all of the field instruments.

Boiler Testing.—One of the four boilers at the heating plant is available for experimental purposes.

Lantern Slides and Photographs.—The engineering school has between two and three hundred lantern slides, prepared by the late Professor R. S. Miller, on steam engineering, machine design, etc., and fifty metallurgical slides, donated by Mr. F. C. Clerc, of Denver. The College has also a representative collection of blue prints and photographs of important engineering structures.

Geometrical Models.—For illustrating subjects in Descriptive Geometry and Graphic Statics there are in the Drafting Room a number of models prepared by students. The collection includes half a dozen thread models of ruled surfaces. In the mathematical class-room there are a number of models of wood and of plaster of Paris.

MINING ENGINEERING COURSE.

The course in mining engineering is designed to give the student a thorough grounding in the theoretical principles upon which the successful practice of mining and metallurgy must rest, to train the student to the habit of investigation, and to familiarize him with current and past practice, especially that in successful up-to-date plants. With this in view there are included, in addition to the courses in mining, metallurgy and geology, thorough courses in mathematics, physics, chemistry, theoretical and applied mechanics. and briefer courses in steam and electrical engineering, surveying and mining law. During the Senior and Junior years frequent visits will be made to neighboring mines and metallurgical plants.

FRESHMAN YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Algebra (Math. A1)	5	Trigonometry (Math. A3)	3
Advanced Chemistry (Chem. B)	7	Descriptive Geom. (Mech. Draw. B)	9
Drawing (Mech. Draw. A)	6	Advanced Chem. (Chem. B)	7
Woodwork (Shop Work A)	6	Elem. Surveying (Civil Eng. A)	8
Rhetoric and Composition (English B)	3	Rhetoric and Comp. (Eng. B)	3
Modern Language	3	Modern Language	3

SOPHOMORE YEAR.

First Half-Year.		*Second Half-Year.*	
Analytical Geom. (Math. B)	3	Analytical Geometry (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Qualitative Analysis (Chem. C)	7	Quantitative Analysis (Chem. D)	7
Gen. Physics (Phy. H)	7	Gen. Physics (Phy. H)	7
Mineralogy (Geol. B)	6	Mineralogy (Geol. B)	6
Machine Design (Mech. Draw. C)	4	Modern Language	2
Modern Language	2	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
General Geology (Geol. A)	3	Testing Laboratory	3
Quant. Anal. (Chem. D)	12	General Geology (Geol. A)	3
Mine Surveying (C. E. AM)	5	Assaying (Met. A)	9
Masonry Structures (C. E. E)	2	Met. of Iron and of Gold (Met. B & C)	3
Power Plants (Elect. Eng. Q)	2	Mining Engineering A	3
		Power Plants (Elect. Eng. Q)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.		*Second Half-Year.*	
Economic Geology (Geol. E)	3	Petrography (Geol. H)	3
Hydraulics (Civ. Eng. H)	2	Mine Plant and Equip. (Min. Eng. C)	3
Ore Dressing (Min. Eng. B)	3	Electrical Machinery (Elect. Eng. P)	2
Mining Engineering A	2	General Metallurgy (E)	1
Electrical Machinery (Elect. Eng. P)	2	Electro-metallurgy (Met. D)	1
Non-Ferrous Metallurgy (Met. C)	3	Mining and Met. Laboratories	9
Mining and Met. Laboratories	9	Memoirs and Abstracts	1
Mining Law	1	Thesis.	
Memoirs and Abstracts	1		
Thesis.			

CIVIL ENGINEERING COURSE.

The four years' course leading to the degree of Bachelor of Science in Civil Engineering is designed to afford a thorough analytical training, as well as numerous and extended practical exercises in those matters that pertain to the profession of the civil engineer,

including all kinds of structures and public works and also the various developments and applications of power by the use of electric, steam, water and air motors.

The theoretical portion of the instruction is based largely upon the courses given in the departments of mathematics and physics, and the results obtained are applied to practical engineering work. Special stress is laid upon the design by the student of the various structures and machines which the civil engineer is called upon to construct in the practice of his profession.

The instruction is given by lectures, demonstrations by the student, and frequent conferences, co-ordinate with which the work of design is carried on. It covers comprehensively the subjects of surveying, water supplies of cities and towns, irrigation, sanitary engineering, including sewage disposal, graphic and analytic treatment of all metallic structures, foundations, retaining and reservoir walls, high masonry dams, sewer systems, hydraulic engineering, rivers and harbors, hydraulic, steam and electric motors.

FRESHMAN YEAR.

As in the Mining Engineering Course.

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	2	Analytical Geom. (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Gen'l Physics (Phys. H)	7	General Physics (Phys. H)	7
Mineralogy (Geol. B)	6	Petrography (Geol. H)	3
Machine Design (Mech. Draw. C)	4	Graphic Statics (Mech. Draw. D)	4
Modern Language	2	Modern Language	2
Field Astronomy (Astr. E)	3	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
Hydraulics (Civ. Eng. H)	2	Testing Laboratory	3
Power Plants (Elect. Eng. Q)	2	Theory of Trusses (Civ. Eng. C)	3
Masonry Structure (Civ. Eng. E)	2	Power Plants (Elect. Eng. Q)	2
Advanced Surveying (Civ. Eng. AA)	8	Railroad Surveying (Civ. Eng. G)	4
		Masonry Structures (Civ. Eng. E)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.		*Second Half-Year.*	
Foundations (Civ. Eng. F)	2	Design of Bridges and Buildings (Civ. Eng. D)	4
Design of Bridges and Buildings (Civ. Eng. D)	4	Irrigation (Civ. Eng. J)	2
Railroad Engineering (Civ. Eng. G)	4	Sanitary Engineering (Civ. Eng. K)	3
Water Supply (Civ. Eng. I)	3	Roads and Parks (Civ.Eng.L)	2
Elementary Law	3	Mining A	3
Electrical Machinery (Elect. Eng. P)	2	Electrical Machinery (Elect. Eng. P)	2
Thesis.		Thesis.	

IRRIGATION ENGINEERING COURSE.

In order to meet the demand for men trained in the design, location and construction of irrigation works, a special course in irrigation engineering is offered. The first year of this course is the same as in the Civil Engineering course; the second, third and fourth years differ from the regular Civil Engineering course in the substitution of special work in agricultural chemistry, soil physics, advanced work in hydraulics, and the design of stone, timber and

steel irrigation structures for those subjects that bear less directly upon irrigation problems. The full equipment of the Civil Engineering department, including surveying instruments, testing machines, hydraulic laboratory and maps and plans, is available to the students of Irrigation Engineering.

The course differs from that in Civil Engineering in the following respects:

Sophomore Year.—Agricultural Chemistry (Chem. H) takes the place of Geology B during the first half-year and of Geology H during the second half-year, and Astronomy E is omitted.

Junior Year.—During the second half-year Soil Physics, and Irrigation (Civ. Eng. J) take the place of Theory of Trusses (Civ. Eng. C) and Railroad Surveying (Civ. Eng. G), and Geology A replaces Power Plants (Elect. Eng. Q).

Senior Year.—During the first half-year Irrigation Law and Hydraulic Engineering (Civ. Eng. N) take the place of Railroad Engineering (Civ. Eng. G) and Elementary Law. During the second half-year Hydraulic Engineering (Civ. Eng. N) and Agriculture take the place of Roads and Parks (Civ. Eng. L) and Mining A.

ELECTRICAL ENGINEERING COURSE.

The primary object of the course in Electrical Engineering is to develop an ability to solve electrical problems of a technical as well as of a commercial nature. The aim in the work is to give the student a broad foundation in the fundamental engineering principles, and then to clinch them by laboratory experimental work. The work in the study of Electricity begins in the Sophomore year, when in the Physics course the fundamental laws of Electricity and Magnetism are studied and the fundamental experiments performed in the laboratory.

The laboratory work embraces a detailed study of instruments, methods and electrical apparatus of modern practice both in direct and alternating currents.

Emphasis is laid on laboratory reports in which results of tests

made by the students are discussed, both as to the theory and design of the machine under test and as to the applicability and accuracy of the method used.

The numerous plants in and about Colorado Springs afford unusual opportunity for the study of the application of electricity to long-distance transmission, mining, smelting, to street car service and city lighting.

FRESHMAN YEAR.

As in the Mining Engineering Course, except that Shop-work B takes the place of Surveying during the second half-year.

SOPHOMORE YEAR.

As in the Mining Engineering Course, except that Mineralogy (Geology B) will be replaced during the first half-year by Shop-work C and during the second half-year by Graphic Statics (Mechanical Drawing D).

JUNIOR YEAR.

First Half-Year.	Hours per week.
Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3
Hydraulics (Civ. Eng. H)	2
Power Plants (Elect. Eng. Q)	2
Precise Measurements (Physics K)	2
Machine work and tool-making (Shop-work D)	6
Direct Current Machinery (Elect. Eng. A)	3
Chemistry I	4

Second Half-Year.	Hours per week.
Mathematics J	4
Civil Eng. B	2
Alternating Current Theory (Elect. Eng. B)	3
Elect. Eng. Q	2
Shop-work D	6
Elect. Laboratory (Elect. Eng. C)	3
Electrical Engineering Measurements (Elect. Eng. D)	2
Principles of Dynamo Design (Elect. Eng. E)	2
Electrical References (Elect. Eng. O)	2

SENIOR YEAR.

First Half-Year.	Hours per week.
Alternating Current Machinery (Elect. Eng. F)	3
Direct Current Laboratory (Elect. Eng. G)	3
Electrical Engineering Instruments (Elect. Eng. H)	1
Central Station Design (Elect. Eng. I)	6
Experimental Engineering (Elect. Eng. J)	3
Electrical References (Elect. Eng. O)	2
Thesis.	

Second Half-Year.	Hours per week.
Electrical Power Transmission (Elect. Eng. K)	3
Alternating Current Laboratory (Elect. Eng. L)	3
Electrical Machinery (Elect. Eng. M)	6
Practical Electro-chemistry (Elect. Eng. N)	2
Electrical References (Elect. Eng. O)	2
Elect. Eng. H	1
Inspection Tours.	
Thesis.	

Departments of Instruction

MINING.

PROFESSOR CRABTREE.

The instruction in mining begins at the opening of the second half of the Junior year, and continues through the course. The lectures and recitations will occupy three or five hours each week and will be supplemented by study of text-books and journals and illustrated by models, photographs, etc. The lectures are divided into courses as follows:

A. Ore deposits, prospecting, boring and drilling, excavation, tunneling, shaft sinking, timbering, exploitation, ventilation, drainage, accidents, etc.

B. *Ore Dressing*—Crushing, screening, milling and concentration of ores by jigs, hydraulic classifiers, shaking tables, vanners, slime tables, etc. Mechanical preparation of coal.

C. *Mine Plant and Equipment*—Machinery and appliances used in transportation, hoisting and storing of materials, in generating

and transmitting power; compressors, electrical machinery, air drills, etc.

D. *Laboratory*—A course of experimental work in crushing, screening, classification and concentration of ores. In this course it is expected to illustrate the theoretical principles of ore-dressing and analyze each step in the process.

METALLURGY.

Professor Crabtree.

The study of Metallurgy begins at the opening of the second half of the Junior year, and continues throughout the course. It includes lectures, study of text-books and journals, laboratory experimental work, and visits to mining and metallurgical plants. The lectures will be illustrated by lantern slides, photographs, blue prints, models, and samples of ores and products.

A. *Fire Assaying.*—The course in fire assaying is given three afternoons each week in the second half of the Junior year, and includes lectures and recitations on the theory and practice of sampling, fluxing and assaying of gold, silver, lead and copper ores, bullion and mattes, as well as practical work in the laboratory. Each student will be required to make a large number of careful and accurate assays of various grades and kinds of ores, of copper mattes, and of bullion, using the scorification, crucible and combination methods. Wet methods for ores, mattes, slags and fuels are taught by a thorough course in the Quantitative Chemical laboratory. Fee, $15.

B. *Iron and Steel.*—Careful study of the ores, fuels, fluxes; theoretical principles and the processes of manufacture of pig iron, wrought iron, Bessemer and open hearth steel, cement and crucible steel; physical and chemical properties of iron and steel; commercial and engineering specifications.

C. *Non-Ferrous Metallurgy.*

Lead—Roasting of ores; fluxes and slags; smelting, in blast furnace and in reverberatory furnace; desilverization of base bullion; cupellation.

Copper—Roasting of ores; smelting in reverberatory and in blast furnaces; pyritic smelting; refining in converter, in reverberatory furnace, by electrolytic processes, wet processes.

Silver—Study of Patio, Washoe, Reese River, Boss, Ziervogel, Russell and other processes for the extraction of silver from its ores.

Gold—Crushing, roasting and milling of gold ore; amalgamation; chlorination process; cyanide process; melting and refining.

Also a review of the metallurgy of zinc, aluminum, and other metals.

D. *Electro-metallurgy*—A study of the present-day applications of electricity to smelting and refining.

E. *General Metallurgy.*—Properties of metals and alloys; heat treatment of metals; fuels; refractories; pyrometry; metallography. Fee, $4.

CIVIL AND IRRIGATION ENGINEERING.

PROFESSOR LYON AND MR. MOORE.

A. *Theory and Practice of Surveying.*—Construction, use and adjustment of instruments; pacing survey; contouring and levelling by hand level; theory of stadia measurements; azimuth traverse; balancing survey. Four hours' credit, second half, Freshman year. Two recitations and two afternoons' field or office work. *Required of Civil, Irrigation and Mining Engineers.* Fee, $4.

AA. *Advanced Surveying.*—Topographic, hydrographic, city and mining surveying. Instruments and field methods used in geodetic surveying. Simple, compound and reversed railroad curves; turnouts and switches; theory of earthwork computations. Two recitations and six hours of field or office work, first half, Junior year. *Required of Irrigation and Civil Engineers.* Fee, $4.

AM. An abridgement of Course AA, for Mining Engineers. Two hours' recitation, and three hours' field or office work, first half of Junior year. Fee, $2.

B. *Resistance of Materials.*—Laws of elasticity in homogeneous materials; coefficients of elasticity; relations between stresses and strains; common theory of torsion and flexure; elastic limits, working stresses and ultimate resistances of wrought iron, cast iron, steel, alloys, timber, building stones, concrete and masonry; simple and continuous beams; design and construction of iron, steel, and timber columns and beams, including design of plate girders; shafts; cables, specifications. Three hours' lectures and recitations during Junior year, with work in the cement and testing laboratory. *Required of all engineers.* Fee, $4.

C. *Theory of Trusses.*—The truss element; simple, cantilever and noncontinuous trusses with parallel chords; fixed and moving loads; through and deck spans; position of any system of concentrated moving loads for greatest chord and web stresses, when chords are parallel and when they are not so; combination of analytical and graphic methods; skew and irregular trusses; application to bridge and roof trusses; arched ribs. Three hours' credit, second half, Junior year. Lectures and recitations with problems and design work. *Required of Civil Engineers.*

D. *The Design and Construction of Bridges, Roofs and Buildings.*—Railway and highway bridges; pin and riveted connections; single and multiple systems of bracing; the design of details for bridges, roofs and buildings; floors for railway and highway bridges; design and operation of draw bridges, including engines, locking, lifting and turning machinery; cantilever structures; wind loads and stresses; single and double track viaducts or trestles in iron, steel and timber; complete design of a railway bridge, with estimates of cost. Four hours' credit, Senior year. Lectures, recitations and design work in the drafting room. *Required of Civil Engineers.*

E. *Masonry Structures.*—Cement, concrete and masonry; pressure and abutting power of earth; design and construction of retaining walls; stability of masonry structures, including towers

and chimneys; theory and design of arches; theory and design of reservoir walls, earth and high masonry dams. Two hours' credit, Junior year. Recitations, lectures and design work in the drafting room. *Required of Civil and Irrigation Engineers. Mining Engineers take first half of this course.*

F. *Foundations.*—Foundations for buildings; safe loads on masonry and foundation beds; examinations of foundation sites; pile driving and pile foundations; sheet-piling and cofferdam methods; pneumatic foundations and caisson work; open dredging; bridge piers of masonry and steel; piers for deep foundations; tunneling. Two hours' credit, first half, Senior year. Lectures and design work. *Required of Civil and Irrigation Engineers.*

G. *Railroad Engineering.*—Reconnaissance; preliminary survey; location; cross-sections; transition-curves; earth-work computation; turnouts, yard and switch work; sources and value of train resistance; the relation of curvature and grades to velocity and maximum train load; effect of momentum; balance of grades for unequal traffic; analysis of operating expenses; cost of extra distance, curvature, rise and fall, and of additional trains; effect of road bed on cost of running trains; economic value of distance, curvature, rise and fall, and of grades; pusher grades; value of additional traffic; improvement of old lines; ordinary and extraordinary methods of drainage; water supply, its quality, storage and delivery; construction of wooden trestles and masonry culverts; standard plans; estimate of cost. Four hours' credit, second half, Junior year and first half, Senior year. Lectures, recitations, field work, problems and design work. *Required of Civil Engineers.*

H. *Hydraulics.* Flow of water through orifices; time required for discharge of canal locks and similar volumes; weir discharge and gauging by weirs; gauging of water for irrigation systems; flow through and discharge of pipes; design of pipe systems; the Venturi meter; flow and discharge of open canals and rivers; gauging streams. Two hours' credit, first half. Recitations and problem work. *Required of Junior Civil Engineers and of Senior Mining Engineers.*

I. *Water Supply.*—Rainfall and storage; flow of streams; influence of soils, elevation and geologic characteristics of water-shed; methods of supply; underground flow; reservoir construction; distributing systems; house-supply and wastage. Three hours' credit, first half, Senior year. Recitations, collateral reading and design work. *Required of Civil and Irrigation Engineers.*

J *Irrigation Engineering.*—Irrigation of land; amounts and periods of application; grades, cross-section and capacity of canals; surveys for irrigation works; source of water supply; hydrographic data; Colorado streams; return of seepage waters; irrigation by pumping. Two hours' credit, second half. Lectures, recitations and assigned reading. *Required of Civil Engineers in Senior year and of Irrigation Engineers in Junior year.*

K. *Sanitary Engineering.*—Treatment and disposal of sewage and refuse by sedimentation, precipitation and use of septic tanks; teatment of effluent by continuous and intermittent sand filtration; fertilization; disposal of sludge; sand filters; pollution of potable water, and its purification by continuous and intermittent sand filtration; sewage and surface drainage of cities and towns; separate and combined systems of sewers; capacity of mains and branches; catch-basins, manholes; flush-tanks; outfalls; grades and sections; flow and discharge of sewers; construction. Three hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil and Irrigation Engineers.*

L. *Roads, Pavements and Parks.*—Surveys and locations; drainage and grades; foundations; selection and treatment of materials; maintenance of roads and pavements; design, construction and maintenance of parks and parkways. Two hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil Engineers.*

N. *Hydraulic Engineering.*—Continuation of course H. Collection and storage of water; analysis of hydrographic data with particular reference to Colorado and other western states; irrigation reports; organization and administration; pumps and

pumping machinery; principles involved in the design of reservoirs, canals and irrigation structures. Two hours' credit, Senior year. *Required of Irrigation Engineers.*

O. *Design of Irrigation Structures.*—Practical application in the drafting room of the principles studied in the courses in Hydraulic Engineering, Resistance of Materials, and Masonry Structures to actual design work. Four hours' credit, Senior year. Study of plans of existing structures, conferences and design work. *Required of Irrigation Engineers.*

ELECTRICAL ENGINEERING.

ASSISTANT PROFESSOR ARMSTRONG.

A. *Direct Current Machinery.*—Discussion of fundamental laws of electricity and magnetism, theory of the direct current dynamo and motor, the fundamental principles involved, study of characteristics of different types and their various applications. Text, Sheldon's *Direct Current Machinery.* First half of Junior year, 3 hours.

B. *Alternating Current and Transformer Theory.*—The various electrical quantities are discussed mathematically and vectorially; detailed study of efficiency, regulation, etc., of alternators and transformers and their vector diagrams under various conditions of load. Text, Sheldon's *Alternating Current Machinery.* Second half of Junior year, 3 hours.

C. *Electrical Laboratory.*—A laboratory course devoted to the study of various types of laboratory and commercial instruments and electrical measurements. Fee, $3.00. Second half of Junior year, one afternoon.

D. *Electrical Engineering Measurements.*—A course of lectures on various commercial measurements, as applied to direct and alternating current machinery and systems. Second half of Junior year, 2 hours.

E. *Principles of Dynamo Design.*—A course of exercises on the discussion of materials of construction and method of windings

with the electrical and magnetic calculations for direct current dynamos and for transformers. Text, S. P. Thompson's *Design of Dynamos*. Second half of Junior year, 2 hours.

F. *Alternating Current Machinery.*—The study of standard polyphase systems. The design and construction of alternating current apparatus, including single-phase, two phase and three phase alternators, synchronous and induction motors, rotary converters, and static transformers; and their operation both singly and in combination with each other. Text, Oudin's *Standard Polyphase Systems*. First half of Senior year, 3 hours.

G. *Direct Current Laboratory.*—The management and testing of direct current dynamos and motors. The work includes the ordinary tests of heating, efficiency, speed-regulation, parallel and three-wire-system operation. Fee, $3.00. First half of Senior year, one afternoon a week.

H. *Electrical Engineering Instruments.*—A course of lectures devoted to the consideration of various types of commercial measuring instruments for both direct and alternating current work: their general characteristics, accuracy and possible sources of error. Senior year, 1 hour.

I. *Central Station Design.*—This includes the calculation and design of a lighting, power or traction station. The student is given the site and must design a plant to fulfill the given conditions, cost of coal, water, price of land, etc. The sizes of engines, boilers, dynamos and accessory apparatus best fitted for those conditions are calculated and the plant drawn to scale. First half of Senior year, 6 hours.

J. *Experimental Engineering.*—This course is designed to give the electrical engineer a conception of the principles of mechanical engineering. Standard tests of boilers, engines and pumps are performed by the student. Fee, $3.00. First half of Senior year, one afternoon a week.

K. *Electrical Power Transmission.*—This work is a review of the preceding work combined with the study of generation, distribution, transmission and consumption of electrical energy. The problems of electric lighting, electric railways and long

distance high voltage transmission are discussed. Second half of Senior year, 3 hours.

L. *Alternating Current Laboratory.*—A laboratory course including the testing and management of single and polyphase alternators and transformers. Also the experimental operation of various types of machines in combination. Fee, $3.00. Second half of Senior year, one afternoon.

M. *Electrical Machinery.*—This includes the design of a direct current dynamo based on the work in course J. Also the design of a transformer to meet various conditions of transmission. Second half of Senior year, 6 hours.

N. *Practical Electro-chemistry.*—A course of lectures on theoretical and practical electro-chemical manufacturing. Second half of Senior year, 2 hours.

O. *Electrical References.*—A course of reference work in connection with the laboratory reports. Second half of Junior year and throughout Senior year, 2 hours.

P. *Electrical Machinery.*—This course is a digest of courses A, B, C, and D. Required of all Civil, Mining and Irrigation Seniors. Senior year, 2 hours.

Q. *Power Plants.*—Steam engines and their mechanism; mechanical features and construction of condensing, compound, and multiple expansion engines; engine valve gears; details of construction; erection and setting; piping accessories; boiler and their construction; feed water heaters; pumps and secondary apparatus. General plans and design of building. Text, Hutton's *The Mechanical Engineering of Power Plants.* Junior year, 2 hours throughout the year. Required of all engineers.

GRAPHICS.

Mr. Moore.

Students are expected to devote more time to drawing, in the Freshman and Sophomore years, than the number of hours assigned in the schedule, but may do the extra work at such hours as suit their convenience.

Students in all engineering courses are expected to provide themselves with a good and complete set of drawing instruments—design and make to be approved by the instructor.

A. *Elements of Drawing.* This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right line and the bow-pen, conventional representations, mathematical curves, cycloidal and other motion curves, isometric, oblique and orthographic projections, working drawings, tracings, the form and proportions of standard letters, both free-hand and ruled, methods of spacing and laying out titles.

B. *Descriptive Geometry.*—The work consists of recitations from text-books and the graphic solution of problems. After the necessary elementary problems, special attention is given to the practical side of this subject, in its relations to stereotomy, pattern-making, sheet metal work and machine drawing. *Required of all engineers.*

C. *Machine Design,* in the Sophomore year, includes recitations from text-books, the copying and tracing of machine drawings, drawing to scale from models and machine parts, working, detail and assembly drawings, laying out tooth-wheel gearings, and the making of original working drawings from specifications.

G. *Graphic Statics.*—This course includes the study of forces, stresses, couples and moments of inertia and is introductory to the later courses on Theory of Trusses. Recitations from text-books are followed by the application of the principles in the solution of practical problems in roof trusses, involving permanent and temporary loads, snow loads and wind pressures. *Required of civil and electrical engineers.*

E. *Theory of Mechanism.*—The course consists of recitations on theoretical mechanism, motion and interaction of machine parts, mathematical problems in machine design, link motions, etc., with drawing of plates illustrating the practical application of the problems. *Required of electrical engineers.*

SHOP WORK.

SUPERINTENDENT COLLAIS.

In the mechanical laboratories it is aimed to give students some knowledge of carpentry, wood turning, pattern making, blacksmithing, machinists' bench and vise work, and iron lathe and machine tool work. Practical talks and lectures are given.

A. *Bench Work in Wood.* Students acquire a practical knowledge of the handling of tools and keeping them in order, and of executing models and joints in wood, that develop constructive principles in engineering work. *Required of all Engineers.* Fee, $4.

B. *Pattern Making.*—Patterns of parts of machinery are made, also cores, valves, valve stems, models in wood turning, pulleys, sheaves, etc. *Required of Electrical Engineers.* Fee, $4.

C. *Forging.*—Students acquire a practical knowledge of the handling and working of iron, mild steel and tool steel, and of the operations of bending, welding, forming, bolt-making, tempering and tool-making. *Required of all Engineers.*. Fee, $4.

D. *Work in Iron,* including bench-work, chipping, filing, accurate fitting, scraping surfaces, tool-making and finishing, thread-cutting by hand. *Required of Electrical Engineers.* Fee, $4.

E. *Machine Work.*—

(*a*) With the lathe: turning, boring, thread-cutting, tapering, eccentric turning, etc.

(*b*) With the milling machine: surfacing, slotting, dove-tailing, taper work, fluting, gear-cutting, spiral-grooving, etc.

(*c*) With the shaper: surfacing, cubing, cutting key-ways, etc.

(*d*) With the drill press: Boring and countersinking, tool grinding (including all machine tools).

Required of Electrical Engineers. Fee, $4.

Colorado School of Forestry

The new School of Forestry will open at the beginning of the Fall term on September 12. This department will be in charge of a trained instructor who will organize the courses and direct the school. It will rank as an undergraduate course, fitting students for practical service in the field, and will prepare for the more advanced work of the graduate schools. Special attention will be paid to arboriculture in the Rocky Mountain section of the country, and to whatever bears upon the protection and development of forests in this part of the United States.

School of Music

FACULTY.

EDWARD DANFORTH HALE, A. M. 1123 N. Weber St.

Dean of the School of Music and Professor of the Theory and Literature of Music, and the Pianoforte.

A. B. (Williams College), '80; A. M. (*ibid.*), '83; Professor at the New England Conservatory, '85-'04; Colorado College, '05.

MRS. ROBERT BRISCOE. 801 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95; Colorado College, '00.

MRS. FREDERICK A. FAUST. 116 E. Dale St.

Instructor in Pianoforte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

MRS. GEORGE MAJORS PERRY. 120 E. San Rafael St.

Instructor in Voice Culture.

Oberlin Conservatory, '98-'02; Pupil of Mrs. Seabury Ford, William Saal, Felix Hughes, Herbert Witherspoon; Colorado College, '05.

ROBERT W. STEVENS. 18 E. San Miguel St.

Instructor in Pianoforte, Organ and Orchestration.

Pupil of Zeisler, Pratt, Sherwood, Godowski, Theodore Thomas; Colorado College, '05.

COURSE OF STUDY.

A. *General Musical Culture.*—A reciprocal study of composition and the pianoforte. Original work in composition from the outset combined with thorough experimental reading of

Goetschius: *Material of Musical Composition* and *Applied Counterpoint;* Gow: *Structure of Music;* Chadwick: *Harmony;* Cutter: *Harmonic Analysis;* Spalding: *Tonal Counterpoint;* Cady: *Music-Education.* Other authorities consulted. Material of the pianoforte study minutely analyzed, structurally and technically. Further contact with the pianoforte study obtained through the weekly conferences, which are required. Pianoforte study devoted to the masterpieces of musical literature to the end of musical scholarship. The technical work carried on by eclectic, scientific methods, as in the special pursuit of virtuosity. Two or more hours. Tuition, half-year, $50.

B. *Pianoforte, Organ, Voice, Violin.*—Tuition, three-quarters hour weekly, $35 the half-year.

C. *Composition* (including *Harmony and Counterpoint*), *Orchestration.* Tuition, one or more hours weekly, $15 the half-year.

The weekly conferences are devoted to the discussion of all topics vitally related to music study, to the first experience of pupils playing in public—a kind of artist-apprenticeship—and to the structural and technical analysis of the works of the masters. This and other phases of school work, recital-lectures, recitals by faculty and pupils, solfeggio and normal work, are free to all students of the School and College.

Some practical acquaintance with physiological psychology is indispensable to the intelligent prosecution of music study. Students in Course A are expected, and all others are urged, to join the College classes in psychology.

DIPLOMA.

The diploma of the School, given only for satisfactory attainment of musicianship, is a guarantee both of thorough ability as a musician and of the equipment of a competent teacher.

The Cutler Academy

Cutler Academy is named after the late Henry Cutler, of Massachusetts, a generous and steadfast friend of Colorado College. It is under the control of the Board of Trustees of the College. It provides a thorough preparation for any college in the United States. While the preparatory training is the principal aim, the plan of study is so arranged as to meet the requirements of students who do not propose entering upon college work. Classical and Scientific courses are given, in each of which the work covers four years. Many of the advantages enjoyed by the students of the College, are shared by the pupils of the Academy.

The Academy receives young women as day students only, and therefore is open only to those young women whose homes are in Colorado Springs.

Full information as to admission, courses, etc., is given in the Cutler Academy Bulletin, which will be sent on application.

Correspondence concerning the Cutler Academy should be addressed to the Principal, M. C. Gile.

General Information

LOCATION.

Colorado College is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Founded in 1871, under the direction of men of shrewd foresight and broad views, it has maintained from the beginning high standards of morality and culture. Saloons and the attendant destructive influences are absent. Radiating railroad systems and the recent development of neighboring gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers, but the invalids are so far outnumbered that the place has none of the depressing influence so often observed at noted health resorts. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous canons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the opportunity for outdoor exercise afforded by the great number of fine days and the dryness and rarity of the air, helpful in cases of malarial disease, asthma, and incipient phthisis. Students unable to work in other climates may here continue their studies while at the same time making a permanent gain in health.

COLLEGE BUILDINGS.

The buildings of the College are situated on a tract of about 50 acres, in the heart of the best residence portion of the city.

Cutler Hall (formerly Palmer Hall), the oldest building on the campus, was first occupied in 1880. It contains lecture rooms,

and chemical, physical and biological laboratories. It is now devoted to the use of Cutler Academy.

THE LIBRARY, given in 1894 by the late Mr. N. P. Coburn, of Newton, Mass., and erected at a cost of $50,000, is of great architectural beauty and admirably adapted to its purpose. It is of the "Peach Blow" sandstone of Colorado, and its roof is of red tile with copper mountings. The interior, with its ceiling twenty-six feet high, its red oak woodwork, its picturesque galleries, its inviting alcoves, its great stone fire-places, is exceedingly attractive. Long arched windows extend from floor to ceiling. A full-sized cast of the "Winged Victory" of Samothrace stands at one end of the main hall. In recesses are marble busts of Antinous and Dante, and casts of the Hermes of Praxiteles and of Mercie's David. Mr. A. L. Dickerman's collection of rare and valuable Indian curiosities adds to the interest of the room.

THE PRESIDENT'S RESIDENCE, at the northern boundary of the campus, was purchased by the Trustees in 1888, and was remodeled in 1903.

THE ASTRONOMICAL OBSERVATORY is the gift of Henry R. Wolcott, Esq., of Denver, and was completed in 1894. Besides the dome room it contains a lecture room, a transit room, and a photographic dark room.

THE GYMNASIUM, built by the students of the College in 1891, contains a useful assortment of apparatus. See "Physical Training," p. 98.

THE PERKINS FINE ARTS HALL, named for one of the principal donors, the late Willard B. Perkins, of Colorado Springs, was completed in 1900. It is a two-story stone building, erected at a cost of $30,000. The lower story is a large auditorium, seating 600, in which the chapel exercises are held and concerts and lectures are given. This room contains a valuable pipe organ, given by Miss Elizabeth Cheney, of Boston, Mass., in memory of her brother, Mr. Charles P. Cheney. In the hallway stands a bronze statue of the Flying Mercury. The upper story contains the lecture and practice rooms of the School of Music, the studios and the art gallery, in which are hung a few choice paintings, which, it is hoped, are the nucleus of a large collection—Mr. Leslie J. Skelton's "Meadow-land, Montigny, France," a picture by Iwill, two paintings by Mr. Harvey

Young, "Crystal Lake, California," and "La Sal Mountains," and "Mlle J." by Mr. Howard M. Hartshorn, which was exhibited at the Paris *Salon* of 1902, and recently presented to the College by Mr. Hartshorn. On the walls of the upper hall is a valuable collection of Japanese prints, presented by Mr. James F. Burns.

Palmer Hall, completed in the fall of 1903, at a cost of $287,000, contains the offices of administration and laboratories for scientific work in all departments. It is two hundred and eighty-seven feet long with a depth from north to south of ninety-five feet. Besides a sub-basement six feet high, there are three stories, a basement and a first and second floor. The style of architecture is that which has been chosen for the entire system of buildings eventually to occupy the College reservation, the first example of which was presented in the Coburn Library. The structure is fireproof, with steel frame and concrete floors, overlaid with terazzo finish. In the basement are laboratories for Chemistry, Physics and Psycho-physics, and a large demonstration room. On the first floor are to be found the offices of administration, general lecture rooms, and other laboratories for Chemistry and Physics. The second floor contains the laboratories and lecture rooms for Biology, Geology and Mineralogy, and a large, well-lighted Museum for the natural science collections of the College. The building was equipped at a cost of $50,000.

COLLEGE RESIDENCES.

Hagerman Hall is a substantial stone building, built in 1889, and used as a home for young men. Besides the students' rooms, which are well lighted and attractive, it contains a dining room, accommodating one hundred and fifty persons, now used by a young men's boarding club, and the Y. M. C. A. reading room. On the roof are some of the Meteorological Station instruments, connected with the electric registering apparatus in the Observatory.

Montgomery Hall was erected and furnished in 1891 by the Woman's Educational Society, and presented free of debt to the College. It provides a comfortable home for young women.

Ticknor Hall, the generous and beautiful gift of Miss Elizabeth Cheney, was opened as a home for the young women of the College in January, 1898. Its comfort and conveniences are the

result of careful study of the most recently-built dormitories for women. Besides students' rooms, it contains the College dining-room, drawing-rooms, and guest-rooms, a study-room for the use of all young women of the College, and an infirmary capable of complete isolation. The infirmary is open to all young women living on the campus, and is in charge of a trained nurse, whose services, whether in the infirmary or in the students' rooms, are paid for by an annual fee of $5.00 from each young woman. This fee is due in September.

McGregor Hall, a commodious and convenient building, was opened in September, 1903, for use as a third residence for young women. It contains a fully equipped gymnasium.

No young woman will be received into the halls who is not of *full college rank,* who is less than sixteen years of age, and who is not taking at least fifteen hours' work or its equivalent. After all vacancies in the halls are filled, suitable rooms in the vicinity may be secured subject to the approval of the Dean of Women.

All the College buildings, except the Gymnasium, are of stone. Heat and electric light are furnished to all from a central plant.

PHYSICAL TRAINING.

The open climate of Colorado Springs makes outdoor sports possible and attractive throughout the year. Tennis is played all winter, track and baseball practice is begun as soon as the football season is over. The young men and the young women have separate gymnasia, furnished with shower baths, lockers, etc.

Football, baseball, basketball and track athletics for the men are managed by the Colorado College Athletic Association. The interests of the Association are controlled by a Board, consisting of Professor M. C. Gile, from the faculty, Messrs. W. R. Armstrong and Hildreth Frost from the alumni, and Messrs. Orrin Randolph and Erle C. Painter from the students. Mr. Willis R. Armstrong is President of the Board.

In 1898 the Athletic Association laid out, at large expense, the Washburn Athletic Field, named in honor of the Rev. Philip Washburn. For this purpose, the natural amphitheatre in the rear of the college buildings, facing the mountains, was used. About five acres of ground were leveled and a grand stand, seating 600,

was erected. In 1900 a grand stand, seating 800, was given by Mr. J. F. Burns. In 1904 a gift of $1,000 from Mr. Charles Washburn, in memory of his brother, together with a gift from General Palmer, made many further improvements possible. The field has been enlarged to contain two football fields, two baseball diamonds, a quarter-mile cinder track, and a two hundred and twenty yard straight-away track. For adaptation to its purposes, there is no more complete and satisfactory college athletic field in the West.

Physical Training for the young women is in charge of Miss Mary Helen Woodsmall. All students are required to take this work. Special exercises are planned for those whose health does not permit them to enter the general classes. Dark blue suits with short skirts and gymnasium slippers are required. Opportunity is given for out-of-door work. A new hockey field and a special athletic field have been made, providing grounds for basketball, tetherball, running, etc.

LIBRARY.

MANLY D. ORMES, LIBRARIAN.

The Library building has been elsewhere described (see p. 96). In it are about thirty-seven thousand volumes and as many pamphlets. The leading literary and scientific journals are received, as are also the United States Government publications and those of the State of Colorado. Of United States documents the library now has about eight thousand volumes, including the records of Congress complete from 1847, and many valuable records for the period 1774-1837. These documents are arranged on the plan adopted in the library of the Superintendent of the United States Documents at Washington.

The Medical Alcove was originated in 1894, when the late Dr. B. F. D. Adams, of Colorado Springs, presented to the College his extensive medical library. The El Paso Medical Society contributes the transactions of Medical Societies and standard works purchased by the Society, in number about a hundred volumes a year. In 1896 the collection was enlarged by the gift of two hundred and fifty volumes and three hundred pamphlets from the late Dr. E. C. Kimball, of Colorado Springs, and again in 1904 by the gift of two

hundred and five volumes from the library of Dr. James A. Hart, also of Colorado Springs.

The Coburn Library Book Club, organized in 1897, provides its members with the best new books, which are given to the Library after two years. The fee is $5 a year or $3 for six months. Members enjoy the full privileges of the Library. The Club has purchased about twenty-three hundred books, of which nearly two thousand have been given to the general Library. The Wednesday Art Club and the local Chapter of The Daughters of the American Revolution have also started collections of books on their special topics. In the Library building is a reading room, where the current literary and scientific magazines, as well as a number of leading newspapers, may be consulted.

In 1904 the Engineering Department of the Library was installed in the basement in a room prepared for the use of the Pike's Peak Polytechnic Society. In addition to the twelve hundred volumes belonging to the College, there are some valuable private libraries on the shelves loaned by members of the club, to which students of the Engineering Department have access.

In room 44 of Palmer Hall are about 300 volumes which form the beginning of a department library for Greek and Latin. These books have been given to the Classical Department by Mrs. M. C. Gile.

LABORATORIES AND APPARATUS.

BIOLOGY.

The Biological Laboratories consist of eight thoroughly-lighted and convenient rooms on the second floor of Palmer Hall. In these each student is assigned a desk and in courses requiring microscopic observation is furnished with a microscope for which he is held responsible. There is an abundant supply of all kinds of glassware necessary for the various courses, also micrometer-eye-pieces, cameras, dissecting microscopes, paraffine bath, microtomes (Reichert's and Minot's), life-boxes and charts. For the courses in Zoology, Comparative Anatomy, etc., a number of mounted and disarticulated skeletons and anatomical models are provided. A large amount of the museum material is also available for illustration in these courses. The physiological laboratory is supplied with such Har-

vard apparatus as the capillary electrometer, rheochord, inductoriums, kymographs, moist chambers, muscle warmer, heavy muscle-lever, ergograph, and a number of smaller pieces. In addition there are on hand such pieces as Kronecher's mercury cup metronome, Ludwig's arm support and sphygmograph, Marey's cardiograph, stethoscope, Erlanger's sphygmomanometer for blood-pressure determinations, Thoma-Zeiss hæmacytometers for the enumeration of the corpuscles of the blood, and Fleischl's hæmometer for the estimation of the hæmoglobin of the blood. The equipment for Bacteriology includes an incubator, Arnold steam sterilizer, autoclav, hot-air sterilizer, Becker balance, Trœmner media scale, centrifuge, inoculating water baths, double boilers, hot-water funnels, counting apparatus (Esmarch's and Wolffhuegel's) and other appliances essential to the work. For botanical courses clinostats, auxinometers and a variety of smaller apparatus are provided.

The Herbarium occupies a room in the Biological Department. The nucleus of the collection consists of a herbarium of Colorado plants purchased from Marcus E. Jones. The larger part of the present herbarium is the Edward Tatnall herbarium, which was presented to the College by Miss M. H. Tatnall, of Elmira, N. Y. This collection, of about 22,000 species and varieties, includes representatives of all the great plant groups. Of these there are some 900 Algæ, 1,700 Lichens, 2,000 Bryophytes, 1,050 Pteridophytes, and the remainder, Angiosperms. These specimens, which are carefully and fully labeled, were collected in 23 different states, Canada, Sweden and England, by 65 collectors. A catalogue of these has been prepared, thus making the herbarium especially valuable.

PHYSICS.

The Sophomore Laboratory contains, among other apparatus, a large standard clock equipped with a special magnetic contact-maker, a standard H. J. Green barometer presented by General William J. Palmer, a large Gærtner cathetometer, ballistc pendulum, Borda pendulum, Kater pendulum, chronograph, apparatus for determining moduli of elasticity, an air thermometer, apparatus for determining vapor density and apparatus for determining viscosity of oils. A number of pieces of apparatus have been made by Mr. E. J. Hoff, of Colorado Springs, from original designs furnished by the College. The Photometer room is furnished with a three-

meter photometer track, Lummer-Brodhun screen, and revolving apparatus for the photometric measurement of light sources.

The Electrical Laboratory is equipped for the Junior and Senior experiments. A distribution switch-board in this room furnishes electrical connections with all parts of the Department. This laboratory is also used for the Junior work in the Electrical Engineering course. Some of the latest types of electrical apparatus are included in its equipment. Mention may be made of the following: A standard potentiometer, a Carey-Foster bridge, and Hopkinson Permeameter, from the Willyoung and Gibson Company, a Bose Magnetic Balance, Induction Bridge, a Beggerow Electrometer from the Siemens and Halske Company; from the Hartmann and Braun Company a sensitive moving coil galvanometer, a standard of self-induction and a permeameter testing set complete; from the Cambridge (England) Scientific Company a students' magnetometer and a resistance thermometer. Of the above items the last eight were secured from the exhibits at the St. Louis Exposition.

There are smaller laboratories for Junior and Senior experiments in Optics and Heat, and a photographic developing room.

The Lecture Room is furnished with projection apparatus for transparent slides and for opaque objects such as photographs, mechanical drawings and models.

The Apparatus room contains the apparatus for demonstration work and that not in immediate use. Mention may be made of a large static machine presented by the Alumni Association of Colorado College, a Tesla X-Ray Coil presented by Dr. Gerald B. Webb, of Colorado Springs, a large Michelson Interferometer and a Fluess Air-pump.

GEOLOGY.

The rooms occupied by the Department of Geology, five in number, consist of a general lecture room and laboratory, mineralogical and paleontological laboratories, a departmental library and a photographic dark room. The general laboratory is provided with five large models and relief maps for the illustration of river work, glaciation, and vulcanism, together with a complete set of the geological maps of the United States Geological Survey and nearly 500 topographic maps. Suites of rock specimens are provided, covering all the main types of the igneous, sedimentary and metamorphic rocks, as well as representative specimens from important min-

ing districts in Colorado. A carefully prepared collection of thin sections of rocks is available for microscopic study, covering the varieties of the igneous rocks fully and illustrating their mineralogy. One Siebert petrographic microscope of the 1904 model is provided for every two students.

In the mineralogical laboratory a general collection, numbering several specimens for each of the 175 minerals taught in the introductory course, is set out in open cases for the illustration of the crystal forms and the variations in the massive kinds. Each student is given a working collection covering the same minerals. Crystallography is taught by means of 150 models of crystals in wood and by the aid of a small collection of transparent models. The material for the practice determinations required of every student embraces 3,000 specimens.

For the work in paleontology the collections of fossils in the College museum are employed. They are representative of a large number of the genera in the several classes of invertebrates.

The departmental library contains complete sets of the publications of the United States Geological Survey, Annual Reports, Monographs, Bulletins and Professional Papers with about 150 of the annual volumes issued by the state surveys, and general works of reference.

CHEMISTRY.

The Chemical Laboratories include: (1) The General Laboratory; (2) the Qualitative Laboratory; (3) the Quantitative and Electro-chemical Laboratory; (4) the Organic Laboratory; (5) the Assay Laboratory. In all of these apartments the best features of modern arrangement and construction have been embodied. The lighting and ventilation have received especial care. The hoods are generously distributed in every working room, and each hood is connected with a large separate flue. The ceilings are high, the light excellent, the desk and working space for each student is abundant and the drainage through iron covered floor drains is of the most approved modern type. The desks are provided with combination locks and fitted with very full sets of reagents and all facilities for the prosecution of the work in hand. Adjacent to the laboratories are the preparation rooms, which provide for the ready distribution of supplies. These smaller rooms which are used for particular

branches of chemical study, are supplied with the appropriate means of work, fine balances, spectroscope, the best Schmidt and Hænsch polariscope, photographic apparatus, combustion furnaces and a large assortment of metal and glass apparatus for general and analytical processes of investigation.

OBSERVATORY.

The Observatory has a telescope of four-inch aperture, presented by Mr. Henry R. Wolcott, of Denver, a transit and a sidereal clock, both given by Mr. Charles S. Blackman, of Montreal, Canada, and several of the instruments of the College Meteorological Station. The largest of these instruments, the quadruple register, donated by General Palmer, records minute by minute the direction and velocity of the wind and the sunshine and rainfall, by means of electric connection with instruments on the Observatory and on Hagerman Hall. In shelters are instruments for measuring and recording temperature and humidity. A Draper barograph, given by Dr. S. E. Solly, affords a continuous record of the atmospheric pressure. The Observatory owns bound records of observations and instrumental registers of previous years, together with the beginnings of the meteorological library.

Aside from the value of the new apparatus for purposes of instruction and of scientific investigation, it has increased the ability of the Observatory to render assistance to practical interests. Special information has been furnished on request to the city engineer and to several railway companies, while tabulated statements of the current weather are supplied regularly to the local newspapers, to the city health officer, and, through the Chamber of Commerce, to various applicants at home and abroad, who desire them for publication. Full statistical records are issued semi-annually, as numbers of The Colorado College Publication.

THE WESTERN ASSOCIATION FOR STELLAR PHOTOGRAPHY.

Colorado College, in common with other educational institutions of the State, is interested in the success of the Western Association

for Stellar Photography, an organization which was incorporated October 24, 1904, for the promotion of astronomical science by the use of photographic methods. The officers are: President, Edward C. Pickering, Director of Harvard College Observatory; Vice-President, Herbert A. Howe, Director of the Chamberlin Observatory, Denver; Secretary and Treasurer, Frank H. Loud, Colorado College.

The Association owns an equatorially mounted camera of small aperture, but of excellent definition and accurate mounting, a duplicate of instruments in use at Cambridge, Mass., and Arequipa, Peru. This is the first fixed plant of the kind in Colorado. It is in operation on Nob Hill, about two miles east of the College grounds, and is yielding good results, some of which it is expected will be available in the form of charts for purposes of instruction. Such use has been made, during the past year, of solar photographs (the most of them taken by Mr. W. N. Birchby), on which numerous sunspots appear.

It is found that the transparent air of Colorado is eminently suitable for this species of investigation, and a course including practical work with this instrument is, through the co-operation of the Harvard College Observatory, offered to students of the College.

MUSEUM.

LESTER C. HIMEBAUGH, CURATOR.

The museum is on the second floor of Palmer Hall. Glass showcases extend on all sides of the room. The central part is taken up with the larger specimens. The megatherium and a restoration of the mammoth occupy the west half and the mounted skeleton of a whale occupies the eastern portion. Grouped around them are the large natural history specimens, casts of noted fossils, and at intervals are showcases for small specimens.

The foundation of the Museum was laid by the gifts of Prof. J. H. Kerr, the Rev. E. N. Bartlett, Dr. E. P. Tenney and Mr. George Fowler.

PALEOBOTANY is represented by two cases of Carboniferous. Cretaceous, and Oligocene plant remains classified by Mr. Baker.

Paleontological Department.—Several cases are given up to the display of the invertebrate fossils, which are zoologically arranged. The collection contains typical and rare forms of foraminifera, corals, crinoids, brachiopods, mollusca and arthropoda. The mollusca and echinoderms collected by Prof. Cragin are for the most part from the lower Cretaceous. The mollusca from the Atlantic slope, presented by Prof. Wm. B. Clark, of Johns Hopkins University, are chiefly Tertiary. Besides an excellent geological record, the collection contains a series of casts of noted specimens.

The foundation for the collection in vertebrate paleontology was laid by the purchase for the College of the large paleontological cabinet of Prof. Cragin by General Wm. J. Palmer and the Colorado Springs Company. This collection consists of some 8,000 specimens from Colorado, Kansas, Indian Territory, Texas, and other states, and includes remains of Pliocene horses, llamas, Miocene rhinoceroses and mastodons, Cretaceous saurians, and Tertiary fishes. It is of importance not only as supplying a large part of the geological record not otherwise represented in the Museum, but also as containing the types of many new species and some new genera of fossils. Among these type fossils the most important is the large plesiosaurian reptile *Trinacromerum,* the type of a new genus and species described from the Cretaceous of Kansas in 1888. Another valuable item of the collection is the extensive series of casts of fossil vertebrates given by W. S. Stratton. These casts include such forms as the Ichthyosaurus, Archæopteryx, Glyptodon, Dinotherium head, Elephas head, Mastodon head and tusks, Megatherium and a restoration of Colossochelys, Plesiosaurus, Mammoth and other forms.

Natural History.—Collections in invertebrate zoology occupy several showcases and include cœlenterata, echinodermata, mollusca, and common and rare forms of foraminifera.

Vertebrates are well represented by the large natural history collection received through the generosity of W. S. Stratton. It contains 29 species of fishes, among which are the blue-shark, a few ganoids, and several curious tropical forms. Among the 23 species of reptiles the most important are the Indian crocodile, python, iguana and the gila monster. The collection contains 442 species of birds, including such interesting forms as the ostrich, cassowary, Australian crane, apteryx and Argus pheasant. The ornithology of all parts of the world is represented by the more conspicuous and

striking forms. The mammals number 170 and include a group of mounted orang-utans, a group of all known genera of marsupials, the Indian elephant, rhinoceros, nylghau, polar bear, and a complete mounted skeleton of a large whale.

MINERALOGY.—The collection in mineralogy occupies the north side of the room and includes 1,450 specimens of minerals, common, commercial and rare.

ETHNOLOGY is represented by a series of casts of brains of animals and skulls and brains of different peoples. The series also contains 125 masks of South Sea Islanders and 25 framed pictures of different races.

ANTHROPOLOGY.—The anthropological department contains a large amount of pottery from Missouri, New Mexico and Peru; the Taos pueblo, Pueblo Bonito, and DeChelly ruins are reproduced in miniature. The Bixby-Lang and Deane collections from the cliff-dwellers were received through General William J. Palmer.

The Bixby-Lang collection was made in Southeastern Utah and Northern Arizona during the years 1897-98. The collection includes almost 500 specimens of pottery, implements, skulls and mummies. The specimens of pottery are exceptionally well preserved. The Deane collection was made in Western New Mexico and includes over 800 specimens of pottery, implements, skulls and idols.

There is also a collection of Egyptian relics received from the Egyptian Exploration Society, of which Colorado College is a member.

The Museum contains over 16,000 labeled specimens and about 5,000 more specimens are stored. The work of making a card catalogue is now under way.

RELIGIOUS LIFE.

The College is distinctly Christian, and recognizes Christian character as the highest attainment. It is unsectarian in its management. Inquiry is made of the students at entrance, as to their denominational affiliations, and what churches in the city they desire to attend; lists are sent to the pastors of these churches, who seek out the students and bring about them the influence of church homes. Morning prayer is held in the chapel daily, attendance upon

which is required of all students. Occasionally the service is shortened for the President's addresses, in which he discusses questions bearing directly on student life.

Occasional Sunday Vesper services are held in the chapel, conducted by clergymen of various denominations. The Day of Prayer for Colleges is marked by appropriate observance. Weekly prayer meetings on Sunday afternoons and Friday evenings are in charge of the student organizations.

The Young Men's and the Young Women's Christian Associations are represented by strong branches, under the auspices of which are conducted mission work at home and abroad, and classes for Bible study. These Associations send delegates to all the state and national conferences. The Student Volunteer movement is also represented. Of the former members of the band some are continuing in other institutions their preparation for the foreign field, and others are already actively engaged in missionary work.

At the beginning of the College year members of the Associations meet all trains and welcome new students.

STUDENT PUBLICATIONS.

The *Tiger,* a weekly newspaper, is issued by an editorial board composed of College students. An *Annual* is published in May by the Junior class. A *Handbook* of information is issued at the beginning of the College year by the Y. M. C. A.

LITERARY SOCIETIES.

The Apollonian Club and the Pearsons Literary Society, composed of young men, and the Minerva Society, the Contemporary Club and the Hypatia Society, composed of young women, hold weekly meetings for debate and other literary work.

ORATORICAL AND DEBATING CONTESTS.

The Oratorical and Debating Association, of which all students are members, has charge of contests in public speaking. The Asso-

ciation is supported by a voluntary assessment upon the student body. Four contests are held each year as follows:

The Freshman-Sophomore prize contest in declamation is held early in December. Four speakers from each class compete. The first prize is $15; the second, $10. For the 1905 contest Mr. Charles L. Tutt gave the first prize, Mr. W. K. Jewett the second.

The State Oratorical Contest between Colorado College, Denver University, the University of Colorado and the Colorado Agricultural College, is held on the third Friday in February. The preliminary contest at Colorado College is held a month before that time. A first prize of $25 and a second of $15 are awarded in the final contest.

An Intercollegiate Debate is held in April.

The Memorial Day Contest in Oratory between the men's literary societies is held on the 30th of May. Books valued at $10 and $8 are the prizes offered. The first prize is given by the Colorado Springs Post of the Grand Army of the Republic, the second by the Zebulon Pike Chapter of the Daughters of the Revolution.

Besides these events there is an annual public debate between representatives of the Apollonian and Pearsons Societies.

PHI BETA KAPPA.

A charter of the Phi Beta Kappa Society was granted to Colorado College in September of 1904. The object of the Society is the promotion of scholarship and friendship among students and graduates of American colleges. The members of the Society are elected primarily from the best scholars of the graduating classes of the College; secondly from the graduates of the College whose post-graduate work entitles them to such honor; and lastly from any persons distinguished in letters, science, or education. In addition to scholarship, good moral character is required as a qualification of membership.

One-seventh of the regular members of each graduating class in the collegiate department of Colorado College are eligible to election to the Phi Beta Kappa Society at the end of the first half of the Senior year. No student, however, is eligible who does not take his Junior and Senior years in Colorado College, or who has not re-

ceived a grade-mark of ninety out of a possible one hundred in at least one-half of his college work.

COLORADO COLLEGE SCIENTIFIC SOCIETY.

The Colorado College Scientific Society was organized in 1890. Its objects are: "The discussion of recent scientific results, the promotion among its members of scientific inquiry and investigation, and the publication of the more important papers read at the meetings." Ten annual publications, entitled "Colorado College Studies," have been issued by the society, and a large number of exchanges have been secured from associations of a like nature, including several foreign societies. In 1904 the work of publication was given over to the College.

The Secretary of the Society, to whom all correspondence, exchanges, etc., should be addressed, is Dr. Florian Cajori.

THE COLORADO COLLEGE PUBLICATION.

Under this title are now included the scientific works formerly issued as "Colorado College Studies", as well as the announcements of the various departments of the College, the annual bulletin, the report of the President, etc. This publication appears every six weeks during the academic year. The following papers have been issued during 1905-06:

SCIENCE SERIES.

No. 39. Meteorological Statistics.—Professor F. H. Loud.
No. 40. Notes on Meteorological Topics.—Professor F. H. Loud.
No. 41. The Evolution of the Snow Crystal.—Professor John C. Shedd.
No. 42. Euler's Summation of Reciprocal Powers and Related Series.—Mr. W. Noel Birchby.
No. 43. Student Work on Sunspots and Solar Rotation.—Professor F. H. Loud.
No. 44. The Great Sunspot, March, 1905.—Professor F. H. Loud.
No. 45. Solution of Numerical Cubic Equations.—Professor F. H. Loud.

No. 46. The Mammals of Colorado: A Descriptive Catalogue with Bibliography.—Mr. Edward R. Warren.

SOCIAL SCIENCE SERIES.

No. 5. The Cripple Creek Strike of 1893-4.—Mr. Benjamin M. Rastall.

OFFICERS OF THE ALUMNI ASSOCIATION.

Hildreth Frost, '01	President
Ella Taylor, '97	Vice-President
Jeanette Scholz, '03	Secretary
T. C. Hunt, '03	Treasurer

COLLEGE LECTURE COURSE.

Since 1894 courses of lectures and single addresses have been given in Colorado Springs and other cities in the State. It is the purpose of the College to expand this work, as facilities and opportunities increase.

Following is the programme for 1905-1906:

Professor Louis A. E. Ahlers:
- Shakespeare's King Lear.
- Shakespeare's Macbeth.
- Shakespeare's Merchant of Venice.

Professor William Strieby:
- Ventilation Through Chimneys and Fireplaces.

Professor George I. Finlay:
- Geology of the Pike's Peak Region.
- An Introduction to the Study of Minerals.
- The Cañon of the Colorado River in Arizona.

Dr. A. C. H. Friedmann:
- The Hygiene of the Eye.

Professor Thomas K. Urdahl:
- International Crimes and Criminals.

PROFESSOR E. C. SCHNEIDER:

Food, Food-Values and Digestion.
Some Problems in Nutrition.

PROFESSOR JOHN C. SHEDD:

The Evolution of the Snow Crystal.
Conditions Attending the Lightning Flash.
Methods of Protection Against Lightning.

PROFESSOR E. C. HILLS:

The Spanish West Indies.
Esperanto.

EXPENSES.

Tuition by the year..... $50.00

Students who register for less than eight hours of work pay the usual entrance fees and $7.00 for each half-year course. Any one wishing to attend lectures or recitations without receiving credit upon the College records may secure the privilege of such attendance on the payment of $5.00 for each half-year course.

Matriculation fee $5.00
Library fee 3.00

(From the above named fees there is no rebate in case of withdrawal.)

Board in Montgomery Hall, a week (for young women)..... $3.00
Board in Hagerman Hall (club for young men), a week..... 3.00
Board in Ticknor Hall (college table), a week..... 4.00
Rooms warmed, furnished and lighted, by the year, for each occupant ..... $40.00 to 80.00

The number of rooms under $80 is limited. Applications should be made early. Rooms are rented by the year, and will be retained for incoming students only when the application is accompanied by a deposit of $5. This fee will be credited on the bills for room rent, and will be refunded only in case the room is given up by September first.

Students who room in the College residences are required to furnish towels, bed linen and blankets.

Nurse's fee (see p. 98)	$5.00
Fees of College physician:	
Office consultation	$0.50
Visits to rooms	1.00
Infirmary fee (including meals), a day	1.00

For prolonged illness and in cases of contagious disease, a special nurse is employed, and the expenses are charged to the patient.

COLLEGE BILLS.

The bills for tuition and room rent are issued at the beginning of each half-year, and are payable immediately. Students who withdraw before the end of the term pay full tuition. Students who withdraw less than six weeks before the end of the term pay full room rent. Board bills are payable monthly, in advance, and no rebate is made for absences of less than a week.

SCHOLARSHIPS.

The income of the following scholarships is devoted to the aid of worthy students who may need assistance in completing their course, and who, by their scholarship and character, prove themselves worthy of such assistance.

The Thomas Davee Scholarship of $500, established by the late Mrs. T. V. D. Mitchell, of West Minot, Maine.

The Rice Scholarship of $700, established by friends of the Rev. Chas. B. Rice, D. D., of Danvers, Mass.

The Currier Scholarship of $1,000, founded by the late Hon. Warren Currier, of St. Louis, Mo.

The Edwards Scholarship of $500, given by the Congregational Church of Wellesley Hill, Mass.

The Mary Caroline Quincy Scholarship of $500, given by the late George Henry Quincy, of Boston, Mass.

The Lawrence Myers Scholarship of $1,000, and the Lucy

Platt Myers Scholarship of $1,000, given by Mrs. Lætitia M. Myers, of Plainfield, New Jersey.

The Fay Scholarship of $1,000, founded by the late Eliza A. Fay, of Boston, Mass.

A Scholarship of $1,000, given by Mr. William F. Richards, of Newport, N. H., through the Woman's Educational Society of Colorado College.

The Willard B. Perkins Scholarship of $7,000. The second Willard B. Perkins Scholarship of $7,000. These two scholarships were given by the late Willard B. Perkins, of Colorado Springs.

The Hawley Scholarship Fund of the Woman's Educational Society, now amounting to about $10,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships of such young women of the College as the Faculty may recommend, preference being given to daughters of home and foreign missionaries.

The Hawley Scholarship Fund of Colorado College, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships for such students of the College as the Faculty may recommend who may be fitting themselves for distinctively Christian work.

The Hawley Memorial Fund, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., in memory of her husband, Mr. Martin Hawley, the annual income of which is loaned to "worthy and deserving students of the College, as the Faculty may see proper."

The Strettell Memorial Fund of $2,000, given by Mrs. Alma G. V. Harrison, of London, England, and General William J. Palmer, of Colorado Springs, in memory of Mr. Arthur E. V. Strettell, Mrs. Harrison's brother, who died in Colorado Springs in 1882. The income of this fund is to be used to aid students suffering from lung troubles.

The Mary G. Slocum Scholarship of $100 a year, given by the Woman's Educational Society of Colorado College. This scholarship is awarded on the basis of competition to young men of the Junior Class.

The Ruth Danforth Scholarship of $1,000, established by Mrs. Emma Danforth Wiley, of Colorado Springs.

Several other scholarships are supported by annual subscriptions.

SELF-SUPPORT.—Advanced students of high standing have occasional opportunities for private teaching. Capable and faithful young men can often find work in town. A limited amount of service in Montgomery and Ticknor Halls is offered to young women. This is not often available for first-year students.

PRIZES.

The Hastings Prizes.—The sum of $1,000 has been given by Mr. Frederic R. Hastings, of Colorado Springs, the income of which is to be used in providing prizes for sufficiently creditable theses produced by students in Philosophy K.

THE COLORADO COLLEGE PARK ASSOCIATION.

During the last four years the Colorado College Park Association has expended about $10,000 in parking the campus. General William J. Palmer has contributed towards its maintenance for five years by an annual contribution of $1,000.

THE WOMAN'S EDUCATIONAL SOCIETY.

This Society was formed in April, 1889, by the women of Colorado Springs. Its purpose, as expressed in its constitution, "is to give physical, intellectual and spiritual aid to students in any department of Colorado College." This Society built Montgomery Hall, furnished Ticknor and McGregor Halls, and has been of service in many ways to the College. Its members endeavor to come into personal relation with the students, especially with those who are supporting themselves; they try to find work for them and by friendly advice assist them in their efforts to secure an education. Loans are made on the following conditions:

First—Loans may be made to students who have been in the

College for one term and are recommended by the Faculty as in every way deserving of such aid.

Second—No student shall be allowed to incur an indebtedness to the Society of more than $300.

Third—Students may receive loans without interest until their connection with the College ceases; after that time their notes shall draw interest at 4 per cent.

For the scholarships within the gift of the Society see p. 114.

The officers for the current year are:

President—Mrs. William F. Slocum.
First Vice-President—Mrs. Francis W. Goddard.
Second Vice-President—Mrs. L. A. E. Ahlers.
Third Vice-President—Mrs. M. C. Gile.
Recording Secretary—Mrs. W. E. Fette.
Corresponding Secretary—Mrs. Edward S. Parsons.
Treasurer—Mrs. Florian Cajori.
Auditor—Miss Priscilla Sater.

HOSPITAL FUND.

The Trustees of the Bellevue Sanitarium have given to the College nearly $4,000 as the nucleus of a hospital fund for the students.

THE NEEDS OF THE COLLEGE.

Colorado College, never more truly than today, has great and pressing needs. Its growth during the last fifteen years has been steady and rapid, and its friends have generously assisted in helping it meet its constantly enlarging opportunity. But, while buildings have been provided fairly commensurate with the practical needs of its work, in other directions the College has entirely outgrown its resources. If it is to do the work which legitimately belongs to it and have its part in meeting the educational demands of the great section of country in which it is located, if it is to provide a thorough and broad training under positive Christian influences for those who are coming to it in constantly increasing numbers, not only from

Colorado, but from the entire country, it must have in the immediate future larger resources than those upon which it has been obliged to rely during the last few years.

Among the pressing needs are the following:

General Endowment.—For the last ten years the College has been doing a work equal in amount and quality to that done by older eastern institutions possessing three or four times its endowment funds. In consequence each year a deficit has had to be faced. At present a movement is under way to secure an additional $500,000 for the endowment fund. This is needed to pay the actual present running expenses of the College. A much larger sum must be provided if the College is to go forward to fill its place in the educational life of the country.

It is hoped that one form in which this large endowment will be bestowed is in the provision of permanent funds for individual professorships.

Funds for the Library.—The library has only a few hundred dollars of permanent funds. It must rely for increase upon gifts and upon purchases made out of current expense funds to meet the absolute requirements of the different departments. There is an imperative need first for money to be used at once in the filling of gaps in the material the library already possesses, and also for permanent funds from which additions may be regularly made in accordance with the varied intellectual needs of the College.

Special Funds for Scientific Research.—Money to be devoted to scientific work in special lines is very greatly needed. The opportunities of Colorado College in this direction are unusual, because of the geographical, meteorological and geological situation. The attention of those interested in the advancement of science is earnestly called to this fact.

Funds for the Engineering School.—This department of the College needs a considerable sum of money to be immediately expended in the proper development of its work and also a large endowment fund to secure its stability and future growth. Large gifts bestowed for these ends will directly aid in the development of the rich resources of Colorado and the adjoining mountain states.

Residence Hall.—It is hoped that the young men may soon be provided with another residence hall, as the need is most pressing.

Scholarships.—The Trustees desire to emphasize the fact that many young people in a new country are obliged to earn their education by hard and self-denying work. Colorado College still needs a large addition to her scholarship funds. Money thus applied tends directly to the profit of the individual and of the country.

Fellowships.—It would be of great value in developing higher standards of scholarship if several graduate fellowships in various departments could be established.

Infirmary.—The Infirmary in Ticknor Hall, which is available for young women only, is inadequate for the growing needs of the College. There should be provided a separate building, in which contagious diseases can be cared for, as well as ordinary cases of illness. During the past year a fund has been started for the endowment of a cot to provide for illness among students who are working their way. Additions to this fund are an urgent need.

FORMS OF BEQUEST.

Those who intend to devise property to Colorado College, or to the Woman's Educational Society, are requested to employ one of the following Forms of Bequest:

"I hereby give, devise and bequeath unto The Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

"I hereby give, devise and bequeath unto the Woman's Educational Society of Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

If property other than money is willed, the form should be correspondingly varied.

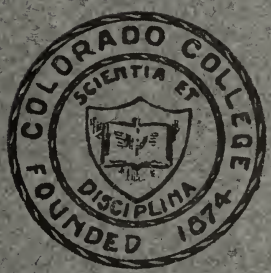
SIGILLUM OFFICII DE GONDY · SUPERIORIS · PRIMI

Colorado College Publication

Bulletin Series 33 General Series 26

BULLETIN

March, 1907



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THIRTY-THIRD ANNUAL BULLETIN

OF

COLORADO COLLEGE

COLORADO SPRINGS, COLORADO

1907

THE HARVARD LIBRARY

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Calendar

1907.

Mar. 26—Last day for registering for Hawley and Mary G. Slocum scholarships.....Tuesday
Mar. 27—**Spring Recess begins** at 1 p. m.....Wednesday
April 4—**Spring Recess ends** at 8:15 a. m.....Thursday
May 30—Memorial Day: a holiday.....Thursday
June 3—Examinations begin .....Monday
June 9—Baccalaureate Sermon .....Sunday
June 10—Class Day .....Monday
June 11—Annual meeting of Board of Trustees.....Tuesday
June 12—**Commencement** .....Wednesday
Sept. 10—Residence Halls open.....Tuesday
Sept. 10—Condition Examinations begin at 2 p. m.....Tuesday
Sept. 11—**First Half-Year begins** at 8:15 a. m.....Wednesday
Nov. 13—Insignia Day .....Wednesday
Nov. 28—Thanksgiving Day: a holiday .....Thursday
Dec. 20—**Christmas Recess begins** at 5 p. m.....Friday

1908.

Jan. 7—**Christmas Recess ends** at 8:15 a. m.....Tuesday
Jan. 20—Mid-Year Examinations begin.....Monday
Jan. 24—Trustees' Day .....Friday
Jan. 27—**Second Half-Year begins** at 8:15 a. m.....Monday
Feb. 9—Day of Prayer for Colleges.....Sunday
Feb. 22—Washington's Birthday: a holiday.....Saturday
Mar. 24—Last day for registering for Hawley and Mary G. Slocum scholarships .....Tuesday
Mar. 25—**Spring Recess begins** at 1 p. m.....Wednesday
April 2—**Spring Recess ends** at 8:15 a. m.....Thursday
April 17—Good Friday: a holiday.....Friday
May 30—Memorial Day: a holiday.....Saturday
June 1—Examinations begin .....Monday
June 7—Baccalaureate Sermon .....Sunday
June 8—Class Day .....Monday
June 9—Annual meeting of Board of Trustees.....Tuesday
June 10—**Commencement** .....Wednesday

Historical Statement

Colorado College is the oldest institution of higher education in the State. In 1874, while Colorado was yet a territory, a College upon a broad Christian foundation was established in Colorado Springs. The authorized announcement for that year contains the following:

"It is the purpose of the Trustees to build a College in which liberal studies may be pursued under positive Christian influences. . . . The College is under no ecclesiastical or political control. Members of different churches are on its Board of Trustees. . . . The character which is most desired for this College is that of thorough scholarship and fervent piety, each assisting the other, and neither ever offered as a compensation for the defects of the other."

From the beginning, the Board of Trustees has been composed of leading professional and business men of Colorado, together with a few Eastern men of similar standing, and has ever been animated by the purpose avowed by the original Board.

A grant of land had been made in advance of the organization of the College, in 1873, by the Colorado Springs Company, the founders of the City of Colorado Springs. The Rev. Jonathan Edwards was the first professor and executive officer. The first President, the Rev. James Dougherty, was elected in 1875, and was succeeded in the following year by the Rev. E. P. Tenney. From 1885 to 1888 there was no President, but the work of teaching was carried on without interruption. At this time there was only one building on the campus, Palmer Hall, now known as Cutler Academy, erected in 1880.

In the autumn of 1888 William Frederick Slocum was elected President. The faculty was at once enlarged, the courses reorganized, and Cutler Academy incorporated as an associated preparatory school, in which students have since been trained, not only for Colorado College, but for all the leading institutions of the United States. A residence for the President was purchased. Within two years $100,000 was given toward endowment, entirely from within the State of Colorado. Hagerman Hall was built in 1889. In the

same year the Woman's Educational Society was organized and began the work of building Montgomery Hall. In 1890 the Colorado College Scientific Society was founded, and the first number of its publication, "Colorado College Studies," was issued.

Within the past fifteen years the endowment has been raised to $420,000, and the growth of the College in numbers has been equaled by an appropriate enlargement of equipment and activity. The following buildings have been erected: The N. P. Coburn Library, 1894; the Henry R. Wolcott Observatory, 1894; Ticknor Hall, 1897; Perkins Fine Arts Hall, 1900; McGregor Hall, 1903; Palmer Hall, 1903. The President's residence was remodeled and enlarged in 1903.

In 1903 a School of Engineering was opened in connection with the College to meet the increasing demand in the Rocky Mountain region for instruction in applied science. The number of engineering students already enrolled has encouraged the Trustees to develop this department to the fullest degree of efficiency.

Through the generosity of General William J. Palmer and Doctor William A. Bell, who in 1905 presented to the College a tract of land called Manitou Park, the foundation has been laid for a School of Forestry. The School opened in 1906, with Doctor William C. Sturgis as Dean.

The growth of the institution in many directions, and the steady elevation of its standards of work have won for it an assured position. It is able to offer to its students educational facilities of the same grade as are found at Eastern institutions of the higher learning.

Trustees

William F. Slocum, *President of the Board* - 24 College Place.

Willis R. Armstrong - - - - - - - 21 W. Uintah St.

George W. Bailey - - - - 309 McPhee Building, Denver.

Rev. Edward H. Braislin, D. D. - - - - Burlington, N. J.

Hon. John Campbell - - - - - 1401 Gilpin St., Denver.

Rev. James B. Gregg, D. D. - - - - - - - 9 E. Dale St.

J. J. Hagerman - - - - - - - - - - Roswell, N. M.

Thomas S. Hayden - - - - 1637 Sherman Ave., Denver.

Irving Howbert - - - - - - - - - 17 N. Weber St.

William S. Jackson - - - - - - - - 228 E. Kiowa St.

William Lennox - - - - - - - - 1001 N. Nevada Ave.

Horace G. Lunt - - - - - - - - 431 N. Cascade Ave.

Charles M. MacNeill - - - - - - - - 28 W. Bijou St.

William J. Palmer - - - - - - - Out West Building.

George Foster Peabody - - - - 54 William St., New York.

Philip B. Stewart - - - - - - - - 1228 Wood Ave.

Mahlon D. Thatcher - - - - - - - Hill Crest, Pueblo

Frank Trumbull -- - - - - - 1439 Franklin St., Denver.

Standing Committees of the Trustees

EXECUTIVE.

Horace G. Lunt, *Chairman;* George W. Bailey, John Campbell, James B. Gregg, J. J. Hagerman, George Foster Peabody.

FINANCE.

William S. Jackson, *Chairman;* John Campbell, Irving Howbert, William Lennox, Charles M. MacNeill, William J. Palmer, Philip B. Stewart, Mahlon D. Thatcher, Frank Trumbull.

GROUNDS AND BUILDINGS.

William J. Palmer, *Chairman;* Willis R. Armstrong, Thomas S. Hayden, William Lennox, Philip B. Stewart.

INSTRUCTION.

Philip B. Stewart, *Chairman;* James B. Gregg, Horace G. Lunt.

FORESTRY SCHOOL.

William J. Palmer, *Chairman;* Irving Howbert, Philip B. Stewart.

College Officers

William F. Slocum, President.

Edward S. Parsons, Vice-President.

George N. Marden, Treasurer.

Mrs. Priscilla Sater Goodale, Cashier.

Board of Control of the N. P. Coburn Library

Chairman—President Slocum.

Secretary—Manly D. Ormes.

Miss A. R. Bell.

Miss Ellen T. Brinley.

Prof. Florian Cajori.

Mr. Clarence P. Dodge.

Mrs. W. E. Fette.

Mrs. G. A. Fowler.

Prof. M. C. Gile.

Mrs. E. C. Goddard.

Rev. James B. Gregg, D. D.

Mr. C. W. Haines.

Mr. H. C. Hall.

Mr. S. F. Hamp.

Mrs. Robert Kerr.

Judge H. G. Lunt.

Miss Dorothy Palmer.

Prof. E. S. Parsons.

Mrs. Chas. Peabody.

Mr. J. G. Shields.

Mrs. W. F. Slocum.

Mrs. Philip B. Stewart.

Rev. A. N. Taft.

Mrs. A. E. Touzalin.

Prof. T. K. Urdahl.

Mrs. F. H. Weeks.

Faculty

WILLIAM FREDERICK SLOCUM, D.D., LL.D. 24 College Place.

President and Head Professor of Philosophy.

A. B. (Amherst), '74; B. D. (Andover), '78; LL.D. (Amherst), '93; LL.D. (Nebraska), '94; D.D. (Beloit), '01; LL.D. (Illinois College), '04; Colorado College, '88.

LOUIS A. E. AHLERS, A. M. 1428 Wood Ave.

Head Professor of Germanic Languages and Literatures.

A. B. (Harvard), '94; A. M. (*ibid.*), '04; Colorado College, '95.

J. ROY ARMSTRONG, B. S. 1720 Wood Ave.

Professor of Electrical Engineering.

B. S. (Armour Institute), '05; Colorado College, '05.

J. FRED BAKER, B. S., M. F. 615 N. Cascade Ave.

Assistant Professor of Forestry and Manager of College Reserve Lands.

B. S. (Michigan Agricultural College), '02; M. F. (Yale), '04; Colorado College, '06.

KURNAL R. BABBITT, LL. M. 1412 N. Cascade Ave.

Lecturer on Law.

LL. B. (Columbian Univ.), '88; LL. M. (*ibid.*), '89; Colorado College, '04.

WILLIAM NOEL BIRCHBY, A. M. 1025 N. Weber St.

Instructor in Mathematics.

A. B. (Hope College), '99; A. M. (Colorado College), '05; Colorado College, '04.

ALFRED A. BLACKMAN, M. D. 801 N. Nevada Ave.

Medical Adviser.

M. D. (University of Denver), '02; Colorado College, '04.

ERNEST BREHAUT, A. M. 18 E. San Miguel St.

Professor of Latin.

A. B. (Dalhousie), '94; A. B. (Harvard), '96; A. M. (*ibid.*), '97; Colorado College, '98.

MARIANNA BROWN, A. M. McGregor Hall.

Registrar and Instructor in English.

A. B. (Earlham College), '76; A. M. (Cornell), '94; Colorado College, '02.

FLORIAN CAJORI, PH. D. 1119 Wood Ave.

Dean of the School of Engineering, and Head Professor of Mathematics.

S. B. (Wisconsin), '83; M. S. (*ibid.*), '86; PH. D. (Tulane), '94; Colorado College, '89.

CHARLES G. COLLAIS. 30 W. Cache la Poudre St.

Superintendent of Mechanical Laboratories.

Colorado College, '03.

DONALD DEWITT, A. B.* Hagerman Hall.

Instructor in Public Speaking.

A. B. (Colorado College), '03; Colorado College, '03 .

GEORGE IRVING FINLAY, PH. D. 205 W. Uintah St.

Professor of Geology, Mineralogy and Paleontology.

A. B. (Harvard), '98; PH. D. (Columbia), '03; Colorado College,'03.

M. CLEMENT GILE, A. M. 1121 N. Tejon St.

Head Professor of Classical Languages and Literatures.

A. B. (Brown), '83; A. M. (*ibid.*), '86; Colorado College, '92.

HENRY C. HALL, A. B., LL. B. 1401 Wood Ave.

Lecturer on Law.

A. B. (Amherst), '81; LL. B. (Columbia), '83; Colorado College, '03.

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*On leave of absence, 1906-07.

FREDERIC R. HASTINGS, A. M. 1501 Wood Ave.

Lecturer on History of Philosophy.

PH. B. (Colorado College), '91; A. M. (*ibid.*), '92; Colorado College, '99.

ELIJAH CLARENCE HILLS, PH. D., LITT. D. 1111 Wood Ave.

Head Professor of Romance Languages and Literatures.

A. B. (Cornell), '92; (*ibid.*), '92-'93; University of Paris, '93-'94; PH. D. (University of Colorado), '06; LITT. D. (Rollins College), '06; Colorado College, '02.

EDITH PRESTON HUBBARD, A. B. McGregor Hall.

Instructor in Mathematics.

A. B. (Vassar), '01; Colorado College, '02.

RUTH LOOMIS, A. B. Ticknor Hall.

Dean of Women.

A. B. (Vassar), '85; Colorado College, '96.

FRANK HERBERT LOUD, PH. D. 1203 N. Tejon St.

Professor of Mathematics and Astronomy.

A. B. (Amherst), '73; A. M. (Harvard), '99; PH. D. (Haverford), '00; Colorado College, '77.

GEORGE JOHN LYON, B. SC., C. E. 17 Palmer Hall.

Professor of Civil Engineering.

B. SC. (Nebraska), '99; C. E. (Columbia), '04; Colorado College, '04.

HENRY McALLISTER, JR., B. L. 1231 N. Nevada Ave.

Lecturer on Law.

B. L. (Swarthmore), '92; Colorado College, '03.

HOWARD MOORE, C. E. 1140 Wood Ave.

Assistant Professor of Graphics.

C. E. (Princeton), '93; Colorado College, '03.

ATHERTON NOYES, A. B. 10 E. Columbia St.

Assistant Professor of English.

A. B. (Yale), '85; Colorado College, '92.

MANLY D. ORMES, A. B., B. D. 314 E. Columbia St.
Librarian.
A. B. (Yale), '85; B. D. (*ibid.*), '89; Colorado College, '04.

EDWARD S. PARSONS, A. M., B. D., LITT. D. 1130 Wood Ave.
Vice President, Dean and Bemis Head Professor of English.
A. B. (Amherst), '83; A. M. (*ibid.*), '86; B. D. (Yale), '87; LITT. D. (Amherst), '03; Colorado College, '92.

SIDNEY F. PATTISON, A. B. Y. M. C. A.
Professor of English.
A. B. (Rochester), '98; A. B. (Williams), '99; Colorado College, '99.

THOMAS T. READ, E. M., PH. D. Hagerman Hall.
Professor of Mining and Metallurgy.
E. M. (Columbia), '98; PH. D. (*ibid.*), '06; Colorado College, '07.

YNA REINHARDT, A. B. 221 E. Uintah St.
Instructor in Modern Languages.
A. B. (Colorado College), '06; Colorado College, '06.

HENRY ALFORD RUGER, A. M. Hagerman Hall.
Assistant Professor of Philosophy and Education.
A. B. (Beloit), '95; A. M. (Chicago), '05; Colorado College, '04.

EDWARD C. SCHNEIDER, PH. D. 4 Pelham Place.
Professor of Biology.
B. S. (Tabor), '97; PH. D. (Yale), '01; Colorado College, '03.

WILLIAM LUTLEY SCLATER, M. A. 1511 Wood Ave.
Director of the Museum and Lecturer on Comparative Anatomy.
B. A. (Oxford), '85; M. A. (*ibid.*), '90; Colorado College, '06.

JOHN CUTLER SHEDD, PH. D. 1103 Wood Ave.
Professor of Physics.
A. B. (Princeton), '91; M. S. (Cornell), '92; PH. D. (Wisconsin), '99; Colorado College, '00.

HENRY FRANCIS SMITH, A. B., B. D. 328 E. Columbia St.

Assistant Professor of Biblical Literature and Instructor in Classics.

A. B. (Beloit), '97; B. D. (Yale), '03; Colorado College, '06.

ORRIE W. STEWART, A. B. Colorado City.

Instructor in Chemistry.

A. B. (Colorado College), '06; Colorado College, '06.

WILLIAM STRIEBY, A. M., E. M. 805 N. Cascade Ave.

Professor of Chemistry and Metallurgy.

A. B. (University of New York), '75; E. M. (Columbia School of Mines), '78; A. M. (University of New York), '79; Colorado College, '80.

WILLIAM CODMAN STURGIS, Ph. D. Las Pampas.

Dean of the School of Forestry and Lecturer on Vegetable Pathology.

A. B. (Harvard), '84; A. M. (*ibid.*), '87; Ph. D. (*ibid.*), '89; Colorado College, '03.

THOMAS K. URDAHL, Ph. D. 1107 Wood Ave.

Head Professor of Political and Social Science.

B. L. (Wisconsin), '91; M. L. (*ibid.*), '92; Ph. D. (*ibid.*), '97; Colorado College, '00.

O. B. WILLCOX, LL. B. 1515 Wood Ave.

Lecturer on Law.

LL. B. (Michigan), '89; Colorado College, '04.

HOMER E. WOODBRIDGE, A. M. 1512 N. Nevada Ave.

Instructor in English.

A. B. (Williams), '02; A. M. (Harvard), '04; Colorado College, '06.

MARY HELEN WOODSMALL. South Hall.

Instructor in Physical Training.

EDWARD DANFORTH HALE, A. M. 1123 N. Weber St.

Dean of the School of Music and Professor of the Theory and Literature of Music, and the Pianoforte.

A. B. (Williams), '80; A. M. (*ibid.*), '83; Professor at the New England Conservatory, '85-'04; Colorado College, '05.

MRS. ROBERT BRISCOE. 801 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95; Colorado College, '00.

MRS. FREDERICK A. FAUST. 112 E. Dale St.

Instructor in Pianoforte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

MRS. GEORGE MAJORS PERRY. 120 E. San Rafael St.

Instructor in Voice Culture.

Oberlin Conservatory, '98-'02; Pupil of Mrs. Seabury Ford, William Saal, Felix Hughes, Herbert Witherspoon; Colorado College, '05.

ROBERT W. STEVENS.*

Instructor in Pianoforte, Organ and Orchestration.

Pupil of Zeisler, Pratt, Sherwood, Godowski, Theodore Thomas; Colorado College '05.

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*On leave of absence, 1906-07.

Committees of the Faculty

Accredited Schools: Professors Ruger, Gile, Strieby.

Athletics: Professors Gile, Ahlers, Moore.

Courses of Study of Individual Students: Professors Parsons, Noyes, Schneider, Miss Brown, Miss Loomis.

Discipline: The President, Professors Parsons, Cajori, Gile, Schneider, Miss Loomis.

Engineering: Professors Cajori, Lyon, Armstrong, Mr. Collais.

Extension Lectures: Professors Ahlers, Noyes, Schneider, Urdahl.

Fraternities: Professors Cajori, Gile, Hills, Miss Loomis.

Music: Professors Hale, Parsons, Mrs. Faust.

Post-Graduate Degrees: Professors Urdahl, Ahlers, Finlay, Hills.

Publication: The President, *Editor-in-Chief;* Professor Cajori, *Managing Editor;* Professor Urdahl, *Secretary;* Professors Hills, Loud, Parsons, Schneider.

Bulletin: Professors Pattison, Armstrong, Brehaut, Loud

Publicity: Professors Ahlers, Armstrong, Noyes, Urdahl, Woodbridge.

Schedule: Professors Shedd, Loud, Lyon, Noyes, Pattison.

Scholarships: The President, Professors Cajori, Gile, Parsons, Miss Brown, Miss Loomis.

Students' Self-Help: Professors Ruger and Smith, Mr. Collais.

Forestry: Professors Sturgis, Baker, Schneider.

Class Officers: *Seniors,* The President; *Juniors,* Professor Ruger; *Sophomores,* Professor Schneider; *Freshmen,* Professor Hills; *Special Students,* Professor Noyes.

Admission

REGISTRATION.

Before registering, each candidate must present to the Dean a certificate of moral character, signed by some responsible person in the community in which he has made his home. Students are required to register promptly and attend the first exercises in their courses.

ENTRANCE REQUIREMENTS.

1. ENGLISH, 3 units.*
2. HISTORY, 1 unit.
3. MATHEMATICS, 2 units (preferably 3).
4. LATIN, GERMAN, OR FRENCH, 4 units, of which 2 must be Latin.
5. SCIENCE, 2 units (to be selected from the list of sciences given below in 6; but the student is advised to offer Chemistry and Physics. If the student offers Greek, only one unit of Science is required).
6. ELECTIVES, sufficient to make a total of 16 units.
   English, 1 unit.
   Greek, 1, 2 or 3 units.
   German, 1 or 2 units.
   French, 1 or 2 units.
   Spanish, 1 or 2 units.
   Mathematics, 1 unit.
   History, 1 unit.
   Civil Government, ½ unit.
   Chemistry, 1 unit.
   Physics, 1 unit.
   Physiology, ½ unit.
   Zoology, ½ unit.

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*A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 45 minutes each a week.

Botany, ½ unit.
Physiography, ½ unit.
Geology, ½ unit.
Mechanical Drawing, 1 unit.

UNIT COURSES IN PARTICULAR SUBJECTS.

1. ENGLISH—(3 units).

(*a.*) A practical knowledge of grammar and the elements of rhetoric.

(*b.*) A thorough study of the subject matter and style of the following works, recommended by the Joint Conference on Uniform Entrance Requirements in English:

1907-11. Shakespeare's *Macbeth;* Milton's *Lycidas, Comus, L'Allegro,* and *Il Penseroso;* Burke's *Speech on Conciliation with America,* or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration;* Macaulay's *Life of Johnson,* or Carlyle's *Essay on Burns.*

(*c.*) A careful but not minute study of the following works, sufficient to give the candidate a clear idea of their important parts:

1907-11. Group I. (two to be selected): Shakespeare's *As You Like It, Henry V., Julius Caesar, The Merchant of Venice, Twelfth Night.* Group II. (one to be selected): Bacon's *Essays;* Bunyan's *The Pilgrim's Progress,* Part I.; The Sir Roger de Coverley Papers in *The Spectator;* Franklin's *Autobiography.* Group III. (one to be selected): Chaucer's *Prologue;* Spenser's *Faerie Queene,* (selections); Pope's *The Rape of the Lock;* Goldsmith's *The Deserted Village;* Palgrave's *Golden Treasury* (First Series), Books II. and III., with especial attention to Dryden, Collins, Gray, Cowper, and Burns. Group IV. (two to be selected): Goldsmith's *The Vicar of Wakefield;* Scott's *Ivanhoe;* Scott's *Quentin Durward;* Hawthorne's *The House of the Seven Gables;* Thackeray's *Henry Esmond;* Mrs. Gaskell's *Cranford;* Dickens' *A Tale of Two Cities;* George Eliot's *Silas Marner;* Blackmore's *Lorna Doone.* Group V. (two to be

selected): Irving's *Sketch Book;* Lamb's *Essays of Elia;* De Quincey's *Joan of Arc* and *The English Mail Coach;* Carlyle's *Heroes and Hero Worship;* Emerson's *Essays* (selected); Ruskin's *Sesame and Lilies.* Group VI. (two to be selected): Coleridge's *The Ancient Mariner;* Scott's *The Lady of the Lake;* Byron's *Mazeppa* and *The Prisoner of Chillon;* Palgrave's *Golden Treasury* (First Series), Book IV., with especial attention to Wordsworth, Keats, and Shelley; Macaulay's *Lays of Ancient Rome;* Poe's *Poems;* Lowell's *The Vision of Sir Launfal;* Arnold's *Sohrab and Rustum;* Longfellow's *The Courtship of Miles Standish;* Tennyson's *Gareth and Lynette, Lancelot and Elaine,* and *The Passing of Arthur;* Browning's *Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Pheidippides.*

Although the books mentioned above are recommended as preparation for this part of the requirement, they are not prescribed. Books of equal merit, covering a similar range of literary types, will be accepted as equivalents.

2. History—(1 unit). An outline knowledge of the leading facts of either Ancient, Greek and Roman, Mediæval and Modern, American, or English history.

(*a.*) Ancient History: Myers and Botsford, Myers, West, or an equivalent.

(*b.*) Greek and Roman: Botsford, Allen, or an equivalent.

(*c.*) Mediæval and Modern: Myers, or an equivalent.

(*d.*) American: Channing, McLaughlin, Thomas, Johnston, Montgomery, or an equivalent.

(*e.*) English: Larned, Coman and Kendall, Montgomery, or an equivalent.

3. Mathematics—(2 units; preferably 3).

(*a.*) Algebra, through simultaneous quadratic equations (1 unit).

(*b.*) Elementary Plane Geometry: the first five books of Phillips and Fisher's, Wells', or Wentworth's *Geometry,* or an equivalent (1 unit).

(*c.*) Solid and Spherical Geometry (½ unit).

(*d.*) Plane Trigonometry (½ unit).

It is recommended that Algebra and Plane Geometry be reviewed in the last year of the preparatory course.

4. Latin—(*a.*) An accurate and ready knowledge of grammatical forms. *Caesar's Gallic War,* Bks. I.-IV., or an equivalent. Prose Composition based on Cæsar. Careful attention should be given from the beginning to correct pronunciation of the Latin and to the use of idiomatic English in translation. (2 units).

(*b.*) Cicero: seven orations. The following are recommended: The four orations against Catiline, Archias, the Manilian Law, Marcellus. Translation at sight of easy passages of prose. Prose Composition. (1 unit).

(*c.*) Vergil: *Aeneid,* Bks. I.-VI. Prose Composition based on Cicero. (1 unit).

5. Greek—(*a.*) White's *First Greek Book,* or an equivalent. Xenophon's *Anabasis* (20 or 30 pages). Practice in sight translation. The rules of accentuation. (1 unit).

(*b.*) Four Books of the *Anabasis.* Reading at sight. Prose Composition based on the *Anabasis.* Careful grammatical study. (1 unit).

(*c.*) Three books of the *Iliad* with prosody and dialectic forms. Sight translation. Prose Composition. (1 unit).

6. German, French and Spanish—(*a.*) The work of the first year should comprise: (1) Drill in the rudiments of grammar; (2) careful drill in pronunciation; (3) the memorizing and frequent repetition of easy colloquial sentences; (4) abundant easy exercises; (5) the reading in graduated texts of from 75 to 100 pages of German, or from 100 to 175 pages of French or Spanish prose.

(*b.*) The work of the second year should comprise: (1) The careful reading of from 150 to 200 pages of German lit-

erature, or from 250 to 400 pages of French or Spanish literature, in the form of easy stories or historical or biographical sketches; (2) accompanying practice, as before, in the translating from English of easy variations from the matter read, and also in off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill in the rudiments of grammar.

A good selection of texts for the second year, arranged in suitable order for reading, would be:

GERMAN: Andersen, *Maerchen* or *Bilderbuch;* Leander, *Traeumereien;* Hauff, *Das kalte Herz;* Zschokke, *Der zerbrochene Krug;* Hillern, *Höher als die Kirche;* Storm, *Immensee, Der Schwiegersohn;* Heyse, *L'Arrabiata, Das Maedchen von Treppi, Anfang und Ende;* Jensen, *Die Braune Erica.*

FRENCH: (1) Mairet, *la Tâche du petit Pierre,* Malot, *Sans famille,* or Bruno, *le Tour de la France;* (2) Labiche and Martin, *le Voyage de M. Perrichon;* Halévy, *l'Abbé Constantin,* or Merimée, *Colomba;* (3) Dumas, *la Tulipe noire,* or Erckmann-Chatrian, *Madame Thérèse;* (4) Sarcey, *le Siège de Paris,* or Lamartine, *Jeanne d'Arc;* (5) Daudet, *Contes,* or George Sand, *la Mare au diable.*

SPANISH: (1) Valera, *El pájaro verde,* and Alarcón, *El Capitán Veneno,* or about 100 pages of Padre Isla's version of *Gil Blas;* (2) Pérez Galdós, *Doña Perfecta* or *Mariancla;* (3) Echegaray, *Ó locura ó santidad,* Ramos y Vidal, *Zaragueta,* or Moratin, *El sì las niñas.*

A third and a fourth year of German or French will be accepted as an elective entrance subject if the work has been done satisfactorily. Candidates are advised to present two units of German, French, or Spanish, as preparatory to admission to the German B, French B, or Spanish B, given in the College.

7. PHYSICS—(1 unit). Not less than two hours a week of recitation, and four of laboratory work; Carhart and Chute's

Elements of Physics, Wentworth and Hill's *Text-Book of Physics,* or an equivalent.

8. CHEMISTRY—(1 unit). Williams' *Elements of Chemistry,* or an equivalent.

9. PHYSIOLOGY—(½ unit). Textbook work should cover such a text as Blaisdell's *Practical Physiology.* In addition, the course should include a rough dissection, by the teacher, of the frog and cat, and a microscopic examination of the more important tissues.

10. ZOOLOGY—(½ unit). Textbook work equal in amount to that contained in Kellogg, Jordan or Davenport; laboratory work on the structure of at least ten forms and a comparison with other types. The drawings and descriptions in the candidate's laboratory note-book must be certified by the teacher.

11. BOTANY—(½ unit). The requirements include a knowledge of the structure and more important physiological processes of flowering plants, also of the modifications of parts for special functions, of the plant societies, pollenation and dissemination. It is also desirable that the candidate have the ability to identify ordinary seed plants. A laboratory note-book certified by the teacher must be presented by the candidate. Such texts as Bergen's *Foundation of Botany* and Coulter's *Plant Studies* are recommended.

12. PHYSIOGRAPHY—(½ unit). Tarr, Davis, Dryer, or an equivalent.

13. GEOLOGY—(½ unit). Scott's *Introduction to Geology,* or an equivalent, with practice in the determination of the commoner rocks, igneous, sedimentary and metamorphic.

14. MECHANICAL DRAWING—(1 unit).

ADMISSION BY CERTIFICATE.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to the above requirements, will be

admitted without condition into the Freshman Class. Each candidate must bring from the principal of the school last attended a personal statement as to his grade of scholarship.

ACCREDITED SCHOOLS.

The following schools are on the accredited list. Certificates of the satisfactory completion, in any of them, of any branch in the course of study required for admission to the College, will be accepted in place of an examination.

Aspen High School.
Canon City High School.
Canon City So. Side High School.
Central City High School.
Cheyenne (Wyo.) High School.
Colorado Springs High School.
Cripple Creek High School.
Delta High School.
Denver: High School, Dist. No. 1.
" High School, Dist. No. 2.
" High School, Dist. No. 7.
" High School, Dist. No. 17
" Manual Training High School.
Douglas Co. H. S., Castle Rock.
Durango High School.
Eaton High School.
Florence High School.
Fort Collins High School.
Fort Morgan High School.
Fruita High School.
Georgetown High School.
Glenwood Springs High School.
Golden High School.
Gordon Academy, Salt Lake City.
Grand Junction High School.
Greeley High School.
Gunnison High School.
Idaho Springs High School.
Leadville High School.
Littleton High School.
Longmont High School.
Loveland High School.
Manitou High School.
Monte Vista High School.
Montrose High School.
Otero Co. High School, La Junta.
Ouray High School.
Pueblo High School, Dist. No. 1.
" High School, Dist. No. 20.
Saguache Co. High School.
Salida High School.
Telluride High School.
Trinidad High School.
Victor High School.
Walsenberg High School.
Wheat Ridge High School, Alcott.
Miss Wolcott's School, Denver.
Wolfe Hall, Denver.

Certificates from schools not on the accredited list will be considered as the merits of each case may warrant.

ADMISSION BY EXAMINATION.

Candidates for admission, unless admitted by certificate, must pass examinations in the requirements indicated above. Such examinations will be held in Palmer Hall on Tuesday, September 10, 1907.

ADMISSION TO ADVANCED STANDING.

Students will be received into advanced classes on examination in the studies previously pursued. The Faculty may, at their discretion, receive certificates from other colleges as evidence that the student has satisfactorily pursued those or equivalent studies.

SPECIAL STUDENTS.

Special students will be received, at the discretion of the Faculty, into such classes as they are qualified to enter. It is the rule of the College that such students must attend the examinations as well as the ordinary recitations of their classes, subject to the same conditions as other students.

Several of the courses of lectures which form part of the College instruction, particularly in the department of Philosophy, are open to the public on payment of a fee of $5.00 for each half-year course (see p. 125), and without any requirement of examination.

Course of Study

In the College, only one degree is given, that of Bachelor of Arts. To secure this degree the student will be required to complete a course of study consisting of (1) certain prescribed studies, (2) a specified number of hours in a major subject, (3) enough free electives to bring his work up to the total requirement of 60 hours, making an average of 15 hours a week throughout the four years.

PRESCRIBED STUDIES.

FRESHMAN YEAR.....Mathematics A (1), A (2), A (3), 4 hours.
English B, 3 hours.
And one of the following groups:

1. Greek, Latin, and German or French.
2. Greek, German or French, and Science.
3. Latin, German or French, and Science.
4. German, French and Science.

Each subject in the above four groups comes three times a week. For Astronomy, Plane Trigonometry is a prerequisite; for Geology, one year of Chemistry is a prerequisite. If the student does not elect Science in the Freshman year, he must take it in the Sophomore year.

SOPHOMORE YEAR.....English C and D, 3 hours.
History, 2 hours.

Philosophy A and B must be taken in Sophomore year by all intending to take their majors in Philosophy or Education.

JUNIOR YEAR.....Philosophy A and B, 3 hours.
Economics A, first half-year, 2 hours.

SENIOR YEAR.....Philosophy C and D, 4 hours.

MAJOR SUBJECT.

In addition to the above prescribed subjects, each student shall select a major subject, if possible before the end of the Sophomore year, and, in any case, not later than the beginning of the Junior year. The professor in charge of the major subject will act as the student's adviser, and will have authority, with the Dean, to require the completion of work amounting to 15 hours in the major subject, or in the major subject and in such minor subjects as he shall consider necessary, or collateral, work. Mention of the major subject will be made in the diploma.

Any one of the following may be selected by the student as his major subject: (1) Philosophy; (2) Education; (3) Greek; (4) Latin; (5) English; (6) German; (7) Romance Languages; (8) Economics and Political Science; (9) History; (10) Mathematics; (11) Astronomy; (12) Physics; (13) Chemistry; (14) Biology; (15) Geology.

All courses except English B and C and Mathematics A may be counted as part of the requisite 15 hours.

Petitions to change the major subject will be granted only when approved by the professors in charge of both the old and the new subjects, and when granted, the student will be held to all the requirements of the new major subject. In no case can the major subject be changed later than the beginning of the Senior year.

ELECTIVES.

The student shall elect, in addition to the prescribed subjects and the major subject, a sufficient number of courses to bring the total amount of his College work up to 60 hours.

Departments of Instruction

PHILOSOPHY.

PRESIDENT SLOCUM, ASSISTANT PROFESSOR RUGER.

The required work in this department extends over the Junior and Senior years, and gives the student a knowledge of the development of thought in the several departments of philosophy. The various seminary courses afford training in the study and discussion of important psychological, sociological and ethical questions.

A. *Psychology.*—Required of all Juniors. First half-year, 3 hours.—PROFESSOR RUGER.

1. *Neurology.* Anatomy and physiology of the nervous system. Stereopticon lectures presenting the gross and microscopic character of the nervous system. Charts, models and a collection of brains afford further illustrative material for comparative and human neurology. References: *Barker, Donaldson, Loeb, etc.*

2. *General Psychology.*—The general characters and problems of consciousness; the functional point of view in psychology. Especial attention will be given to the psychology of the thought processes. Lectures, demonstrations, experiments by the class, recitations and reports on special topics. Text, *Angell's Psychology.* References: *Thorndike, James, Stout, Titchener, Jastrow, Baldwin, etc.*

B. *Logic.*—Required of all Juniors. Prerequisite, Philosophy A. Second half-year, 3 hours. Formal logic and the logic of science. Lectures, recitations, reports and criticisms of arguments and methods of research. Problems in epistemology and metaphysics will be raised throughout, and the course will thus serve as an introduction to philosophy. Text, Creighton's *Logic.* Collateral reading.—PROFESSOR RUGER.

L. *Experimental Psychology.*—A laboratory course. Sensation including psychophysics, perception, motor changes in cognitive and effective processes, memory, association, fatigue, reaction; statistical methods. The problems of space perception will receive especial attention. References: *Titchener, Sanford, Woodworth, Stratton, Witmer, Bourdon.*—Second half-year, 2 hours.—PROFESSOR RUGER.

M. *Advanced Psychology.*—2 hours. First half-year: Stout's *Psychology* and James' *Principles of Psychology.* Second half-year: Special topics, such as belief, attention, consciousness of self, the emotions, body and mind. Discussions and reports. References: *James, Bain, Mill, Stout, Ward, Hobhouse, Strong.*—PROFESSOR RUGER.

C. *History of Philosophy.*—Required of all Seniors. Prerequisite, Philosophy B. First half-year, 4 hours.—PRESIDENT SLOCUM.

1. *Lectures, Recitations and Conferences.*—3 hours.

(*a.*) Study in Comparative Religions.

(*b.*) Greek Philosophy. 20 lectures.

(*c.*) Modern Philosophy. Lectures: (1) The Rise and Fall of Scholasticism; (2) The Beginnings of Modern Philosophy—Bacon and Descartes; (3) Spinoza; (4) Locke; (5) The Skeptical Movement in France; (6) Leibnitz; (7) Berkeley; (8) Hume; (9) Kant, The Critique of Pure Reason; (10) Kant, The Transcendent Element in his Philosophy; (11) Hegel; (12) Schopenhauer; (13) Lotze; (14) Spencer —The Philosophy of Evolution.

2. *Metaphysical Seminary.*—1 hour.

Papers and discussion upon the following subjects:

(*a.*) Great Religions of the World.

(*b.*) Psychological Basis of Religious Faith.

(*c.*) Psychological Basis of Æsthetics.

(*d.*) Philosophical Thought in England during the Nineteenth Century.

(*e.*) Evolution: Its History, Development and Results.

D. *Ethics.*—Required of all Seniors. Prerequisite, Philosophy C. Second half-year, 4 hours.—President Slocum.

1. *Janet's Theory of Morals.*—Lectures, theses and discussions. 3 hours.
   (*a.*) The Fundamental Principles of Ethics. 12 lectures.
   (*b.*) Christian Ethics. 3 lectures.

2. *Ethical Seminary.*—1 hour.
   Papers and discussion upon the following subjects:
   (*a.*) Modern Social and Sociological Problems.
   (*b.*) The Ethical View of Citizenship.
   (*c.*) A Study of Educational Theories from an Ethical Standpoint.

E. *Modern German Philosophy.*—First half of Senior year, 2 hours. —President Slocum.

F. *The Philosophical Movement in England.*—Second half of Senior year, 2 hours.—President Slocum.

K. *The Evolution of Religious Thought.*—Second half-year, 2 hours.—Mr. Hastings.

(1) Psychological Basis of Religion; (2) Spiritual Import of Greek Philosophy; (3) Religious Development of the Hebrews; (4) Rise of Christianity; (5) Source and Substance of Revelation; (6) Paul and his Mission; (7) Fusion of Greek and Christian Thought; (8) Mediæval Conceptions of Christianity; (9) Spirit of the Renaissance; (10) Cardinal Principle of the Reformation; (11) Philosophical Awakening; (12) Eighteenth Century Conceptions of Religion; (13) Skepticism; (14) Voltaire and Rousseau; (15) Lessing and Freedom of Thought; (16) Philosophy of Kant; (17) German Idealism; (18) Mysticism; (19) Romanticism; (20) Goethe: Religion and Culture; (21) German Criticism of Dogma; (22) Coleridge and Wordsworth; (23) Carlyle and his Philosophy of Life; (24) Newman and the Church Revival; (25) Rise of the Critical Mind; (26) Comte and his Religion of Humanity; (27) Agnosticism; (28) Religious Import

of Evolution; (29) Arnold and Ethical Idealism; (30) Martineau and Christian Theism; (31) Philosophical Idealism; (32) Present-Day Tendencies in Religious Thought.

EDUCATION.

ASSISTANT PROFESSOR RUGER.

A. *History of Education.*—A study of the more important educational theories in their larger relationships. Monroe's *History of Education* will be used as a basis. Each student will be expected to read at least one educational classic and to report on special topics. First half-year, 3 hours.

E. *Philosophy of Education and Principles of Teaching.*—For the former, especial reference will be made to the writings of Dewey, MacVannel, and Horne. For the latter, Thorndike's *Principles of Teaching* will be used; especial attention will be given to the psychological bases of educational methods. Provision is made for a limited amount of practice teaching. Second half-year, 3 hours.

B. *Genetic Psychology.*—Kirkpatrick's *Fundamentals of Child Study* is used as a point of departure. Class reports and discussions. First half-year, 3 hours.

H. *Animal Psychology.*—A study of recent experimental results; simple experiments will be performed. References: Loeb, Jennings, Morgan, Hobhouse, Thorndike, Kinnaman, Yerkes, Watson, Porter, etc. Second half-year, 2 hours.

I. *Mental Development in the Race.*—Second half-year, 1 hour.

D. *A Study of Play in Animals and Man and its Bearing on Education.* First half-year, 1 hour.

G. *Educational Classics.* 2 hours.

C. *Research Work in Psychology and Education.*
For graduate students and advanced undergraduates.
Hours to be arranged.

F. *Journal Club.*—Meets for two hours on alternate Thursdays.

NOTE.—For courses in other departments intended especially for teachers see Greek F, Latin H, German L, French F, Mathematics D, Physics B.

GREEK.*

PROFESSORS GILE AND BREHAUT AND MR. SMITH.

A. Homer, selections from the *Odyssey* and *Iliad* in the original and all the poems in translation; Plato, *Apology* and *Crito;* Herodotus, selections.—3 hours.

B. *Drama.*—Æschylus, *The Septem* and *Prometheus;* Sophocles, *Antigone;* the remainder of Æschylus' and Sophocles' plays in translation; Euripides, *Alcestis* and *Medea.*—3 hours.

C. *History.*
(*a.*) Herodotus; careful study of the period of the Persian Wars. Reading from the dramatists for further illustration of the life of the period; or,
(*b.*) Thucydides, the Sicilian Expedition. Parallel readings in Curtius, Grote and other modern historians. Selections from Plutarch's *Lives.* One half-year, 3 hours.

D. *Philosophy.*—Plato, *Phaedo.* Selections from other dialogues, and from the works of Xenophon. Zeller's *Socrates and the Socratic Schools.* One half-year, 3 hours.

E. *Epic and Lyric Poetry.*—Homer, Hesiod and Pindar. One half-year, 3 hours.

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*Students who enter without Greek are permitted to take, as College work, courses in Greek in Cutler Academy.

F. *A Course Designed for Teachers.*—Selections from Xenophon; composition; careful grammatical study. One half-year, 3 hours.

I. *New Testament Greek.*—Open to students who have had one year of Greek. Second half-year, 3 hours.

H. *Greek History.*—An outline from the earliest times down to 146 B. C. A knowledge of Greek is not required. Second half-year, 2 hours.

NOTE.—For a course in Greek Drama for English readers, see English V.

LATIN.

PROFESSORS GILE AND BREHAUT AND MR. SMITH.

A. Livy, Selections from Books XXI. and XXII.; Cicero, *De Senectute, De Amicitia;* Horace, *Odes.*—3 hours.

B. Horace, Selections from the *Epistles* and *Satires;* Tacitus, *Germania* and *Agricola;* Terence, *Phormio;* Plautus, *Captivi;* Cicero, *Selected Letters.*—3 hours.

C. *Drama.*—Selected plays of Plautus and Terence; history and characteristics of the Roman Drama. One half-year, 3 hours.

D. *Catullus and the Elegiac Poets.*—One half-year, 3 hours.

E. *Satire.*—History and characteristics of Roman Satire. Selections from Horace, Persius, Juvenal. Parallel readings in English literature. One half-year, 3 hours.

G. *Vergil.—The Aeneid,* Books VII.-XII.; the *Bucolics,* and Selections from the *Georgics.* One half-year, 3 hours.

H. *A Course Designed for Teachers.*—Selections from Cæsar and Cicero; composition; careful grammatical study. One half-year, 3 hours.

J. *Roman History.*—An outline from the earliest times to the fall of the Roman Empire. A knowledge of Latin is not required. Second half-year, 3 hours.

ENGLISH.

PROFESSORS PARSONS AND PATTISON, ASSISTANT PROFESSOR NOYES AND MR. WOODBRIDGE.

B. *Rhetoric and Composition.*—Elementary Course. Required of all Freshmen. 3 hours.

C. *Argumentation.*—Prerequisite, Course B. Required of all Sophomores. First half-year, 3 hours.

T. *Advanced Composition.*—Prerequisite, Course C. Second half-year, 2 hours.

D. *American Literature.*—Required of all Sophomores. Irving, Cooper, Poe, Bryant, Hawthorne, Longfellow, Emerson, Lowell, Holmes, Whittier. Second half-year, 3 hours.

S. *Outline History of English Literature.*—First half-year, 3 hours.

G. *Chaucer and Spenser.*—The principal poems read critically in class. Life and thought of the times. First half-year, 3 hours.

H(1).* *The English Drama: Through Marlowe.*—Principles and development. First half-year, 3 hours. Given in alternate years: omitted 1907-08.

H(2).* *The English Drama: From 1590 to 1642, exclusive of Shakespeare.* Second half-year, 3 hours.

I. *The English Drama: Shakespeare.*—The principal plays read chronologically. Second half-year, 3 hours.

J. *Shakespeare.*—A careful study of the language of three or four dramas of Shakespeare. Second half-year, 3 hours.

K.* *Milton.*—A comprehensive study of the poet's personality and work. Given in 1907-08 and every alternate year. First half-year, 3 hours.

L.* *English Poetry from Dryden to Burns.*—First half-year, 3 hours.

M.* *Keats, Shelley, Byron, Coleridge, Wordsworth.*—Second half-year, 3 hours.

N.* *Tennyson and Browning.*—First half-year, 3 hours.

O.* *Modern English Prose.* Carlyle, Arnold, Ruskin. Second half-year, 3 hours.

P. *Old English.*—The beginnings of English Literature. Reading is begun at once and the study is made as literary in character as possible. First half-year, 3 hours.

Q. *Old English.*—Beowulf. Prerequisite, Course P. Second half-year, 3 hours.

R.* *Lyrics.*—Second half-year, 3 hours.

U.* *Nineteenth Century Novelists.*—Jane Austen, Scott, Dickens, Thackeray, George Eliot, Stevenson, Hawthorne. Two recitations; collateral reading; counts 3 hours.

V.* *Greek Drama for English Readers.*—Literary study of Æschylus and Sophocles in poetic translation; lectures on the Greek Theater and on Greek Art. Second half-year, 3 hours.

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*Not open to Freshmen or Sophomores.

PUBLIC SPEAKING.*

Mr. DeWitt.

A. *Declamation.*—One declamation to be prepared and delivered every four weeks. Class training in reading with expression. Southwick's *Steps to Oratory.* 1 hour.

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*See Oratorical and Debating Contests, p. 121.

B. *Oratory.*—An analytical study of the speeches of noted orators. An understanding of the facts bearing upon the man, the subject and the occasion. Lectures on the divisions of the oration. Drill in reading the speeches studied. The preparation and delivery of an oration each half-year. Matthews' *Oratory and Orators,* Clark and Blanchard's *Practical Public Speaking.* 2 hours.

C. *Debate.*—Brief debates before the class; practical suggestions on delivery. First half-year, 2 hours.

D. *Extempore Speaking.*—A brief speech is required each week with a view to general efficiency in public speaking. Criticism and suggestion on thought, expression and delivery. 1 hour.

E. *Reading Course.*—Prerequisite, Course B. Reading and reporting on the speeches of twelve great orators; essays on the men and their achievements. Individual appointments. Text: Cody, *The World's Great Orations.* 1 hour.

GERMAN LANGUAGE AND LITERATURE.†

PROFESSOR AHLERS AND MISS REINHARDT.

A.* *Elementary Course.*—Joynes-Meissner's *Grammar.* Andersen, *Maerchen;* Storm, *Immensee;* Hauff, *Das kalte Herz, Die Karavane;* Eichendorff, *Aus dem Leben eines Taugenichts.* 3 hours.

B.* *Intermediate Course.*—Riehl, *Fluch der Schoenheit;* Jensen, *Die Braune Erica;* Chamisso, *Peter Schlemihl;* Heine, *Harzreise;* Gerstaecker, *Germelshausen;* Lessing, *Minna von Barnhelm;*

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*Authors and books designated under German A, B, C, and D indicate the scope rather than the actual works read in these courses.

†If any course continuing throughout the year is dropped before the end of the year, no credit is given for the work of the first half-year.

Schiller, *Wilhelm Tell, Lyrics* and *Ballads.* Dictation. Prose Composition and Syntax. 3 hours.

C.* Schiller, *Maria Stuart, Die Jungfrau von Orleans;* Goethe, *Egmont;* Sime's *Life of Goethe.* Dictation. First half-year, 2 hours.

D.* Lessing, *Emilia Galotti, Nathan der Weise;* Rollestone's *Life of Lessing;* Goethe, *Iphigenie.* Dictation. Second half-year. 2 hours.

E. *Outline History of German Literature.*—This course is conducted in English, and is open to all College students, whether they are taking German or not. Kuno Francke's *History of German Literature* will be used as text-book. This reading will be supplemented by lectures. 1 hour.

F. *The Nibelungenlied* and the Classic Period of the Twelfth Century. *Hartmann von Aue, Wolfram von Eschenbach, Gottfried von Strassburg.* Lectures and collateral reading. 2 hours.

G. *Middle High German.* — Braune-Paul's *Mittelhochdeutsche Grammatik; Nibelungenlied; Kudrun; Walter von der Vogelweide.* One half-year, 3 hours.

I. *The Faust Legend and Its Development, and Goethe's Faust.*—

Synopsis of the Course:

CHAPTER I. Kindred Legends before the 16th Century. (*a.*) Simon Magus. (*b.*) Ahasuerus. (*c.*) Anthemios, Proterius and Theophilus. (*d.*) Cyprianus Antiochus. (*e.*) Tannhæuser and Don Juan.

CHAPTER II. The historic Faust; the "Faustbuch" of 1587 and its development; the "Puppenspiele."

CHAPTER III. Faust Dramas before the 18th Century. (*a.*) Calderon's El Magico Prodigioso. (*b.*) Marlowe's Tragical History of Dr. Faustus.

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*Authors and books designated under German A, B, C, and D indicate the scope rather than the actual works read in these courses.

CHAPTER IV. Faust in the 18th Century.
Lessing's Fragment: Maler Mueller, Klinger, etc.
CHAPTER V. Goethe's Faust.
(*a.*) The "Urfaust."
(*b.*) Faust, Part I. 1808.
(c.) Faust, Part II.

This course is conducted in German. The class meets once a week for a two-hour period.

K. *The Poems of Goethe and Schiller.*—This course is conducted in German. 2 hours. Given in alternate years: omitted in 1907-08.

L. *A Review for Teachers.*—2 hours; a third hour at the pleasure of the instructor.

M. *Nineteenth Century Literature.*—2 hours; a third hour at the pleasure of the instructor.
Poetry during the wars of liberation; Kleist; Grillpazer; the poems of Uhland and Heine; Friedrich Hebbel: Maria Magdalena, Mutter und Kind, Die Nibelungen; Otto Ludwig: Der Erbförster, Zwischen Himmel und Erde; Emanuel Geibel: Gedichte; Gottfried Keller: Romeo und Julia auf dem Dorfe; Die Heiterethei; Ludwig Fulda; Hermann Sudermann; Gerhardt Hauptmann; Frenssen.

N. *Scientific German.*—For Engineering students only. Prerequisite, German A. 2 hours.

FRENCH LANGUAGE AND LITERATURE.*

PROFESSOR HILLS AND MISS REINHARDT.

A. *Elementary Course.*—Fraser and Squair's *French Grammar;* Aldrich and Foster's *French Reader;* Alfred de Musset, *Pierre*

*If any course continuing throughout the year is dropped before the end of the year, no credit will be given for the work of the first half-year.

et Camille; Labiche et Martin, *le Voyage de M. Perrichon.* Writing from dictation, and practice in speaking. 3 hours.

B. *Intermediate Course.*

1. *Syntax and Prose Composition.* Fraser and Squair's *French Grammar,* and composition. 1 hour.

2. *Modern Prose and Poetry.* George Sand, *La Mare au diable;* Daudet, *la Belle-Nivernaise;* Augier et Sandeau, *le Gendre de M. Poirier;* Anatole France, *le Livre de mon ami;* Bowen's *French Lyrics.* Lectures (2). 2 hours.

   For outside reading: About, *le Roi des montagnes;* Coppée, *Pour la couronne;* Daudet, *le Petit Chose, Tartarin de Tarascon, Tartarin sur les Alpes;* Dumas, *les Trois mousquetaires, la Tulipe noire;* Erckmann-Chatrian, *le Conscrit de 1813, Waterloo, l'Ami Fritz;* Feuillet, *le Roman d'un jeune homme pauvre;* Gréville, *Dosia;* Maeterlinck, *la Vie des Abeilles;* Malot, *Sans famille;* Mérimée, *Colomba;* Ohnet, *le Maître de Forge;* Saintine, *Picciola;* Souvestre, *Un philosophe sous les toits;* Verne, *le Jour du monde en 80 jours, Vingt mille lieues sous les mers;* Vigny, *la canne de jonc, Cinq-mars.* Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works, if approved by the instructor, may be read in the place of those given in the list.

C. *Classical French Literature.*—The following works will be read in class: Corneille, *le Cid, Horace;* Racine, *Andromaque, Athalie;* Molière, *les Précieuses ridicules, le Bourgeois gentilhomme, l' Avare;* Boileau, *l'Art poétique;* La Fontaine, *Fables.* Lectures. 2 hours. Given in 1907-08 and alternate years.

   Outside Reading.—Each student is expected to read three of the following out of class, and pass examination upon them: (1) Mme. de La Fayette, *la Princesse de Clèves;* Saint-Pierre, *Paul et Virginie;* (2) Chateabriand, *Attala* and *René;* (3) Lamartine, *Graziella;* (4) Victor Hugo, *les Misérables* (*extraits*); (5) Balzac, *Eugénie Grandet.*

D. *Nineteenth Century Literature.*—Prerequisites, Courses A and B. The following works will be read in class: Victor Hugo,

Hernani, Préface de Cromwell, Poésies (extraits); Lamartine, *Méditations (extraits)*; Alfred de Musset, *On ne badine pas avec l'amour, Poésies (extraits)*; Sainte-Beuve, *Selected Essays;* Rostand, *Cyrano de Bergerac.* Lectures. 2 hours. Given in alternate years: omitted in 1907-08.

Outside Reading.—Each student is expected to read three of the following out of class, and pass examination upon them: (1) Zola, *la Débâcle;* (2) Ernest Renan, *Souvenirs d'enfance et de jeunesse;* (3) Anatole France, *le Crime de Sylvestre Bonnard;* (4) Pierre Loti, *le Pêcheur d'Islande;* and (5) Maeterlinck, *les Aveugles, Monna Vanna.*

E. *Comedies of Molière.*—The more important comedies of Molière will be read by the instructor. Lectures on Molière and his time. Students desiring this course must consult the instructor. 2 hours. PROFESSOR AHLERS.

F. *Advanced Prose Composition.*—Prerequisites, French A and B. 1 hour.

I. *French Phonetics, and Colloquial French.*—Prerequisites, French A and B. Matzke's *Primer of French Pronunciation* (revised edition) and Kron's *French Daily Life* (Rippman). 1 hour. Given in alternate years: omitted in 1907-08.

J. *Nineteenth Century Fiction.*—Prerequisites, Courses A, B, and C or D. The members of this class will meet individually with the instructor. To each student will be assigned the more important works of fiction and the biographies of two or more writers. Written reports will be required. Not less than 5,000 pages will be read. The final examination will cover not only the works read, but also the student's ability to read French prose with ease and accuracy. 2 hours. Students desiring this course must consult the instructor.

H. *Old French.*—Clédat's edition of the *Chanson de Roland.* 1 hour. Open only to Juniors, Seniors, and Graduates, who have had Latin and French A, B, and C or D. Given in alternate years: omitted in 1907-08.

SPANISH LANGUAGE AND LITERATURE.*

PROFESSOR HILLS AND MISS REINHARDT.

A. *Elementary Course.*—Hills and Ford's *Spanish Grammar;* Ramsay's *Spanish Reader;* Valera, *El pájaro verde;* Alarcón, *El capitán Veneno.* Writing from dictation, and practice in speaking. 3 hours. Students may not elect Spanish A and Italian A in the same year.

B. *Modern Spanish Literature.*—Moratín, *El sí de las niñas;* Pérez Galdós, *Electra;* Echegaray, *El poder de la impotencia;* Hills' *Bardos Cubanos.* Lectures (2). Bi-weekly exercises in prose composition. 2 hours.

For outside reading: Alarcón, *El escándalo, El final de Norma, El niño de la bola, El sombrero de tres picos;* "Caballero", *La familia de Alvareda;* Isaacs, *María;* Palacio Valdés, *La aldea perdida;* Pardo Bazán, *De mi tierra, Los pazos de Ulloa;* Pereda, *Don Gonzalo Gonzales;* Pérez Galdós, *Doña Luz, Pepita Jiménez.* Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works, if approved by the instructor, may be read in the place of those given in this list.

C. *Classical Spanish Literature.*—Padre Isla's version of *Gil Blas* (*extracts*); Cervantes, *Don Quijote* (*extracts*); Calderón, *El mágico prodigioso.* Lectures (2). Outside reading. 2 hours. Given in alternate years: omitted in 1907-08.

D. *Contemporaneous Spanish Fiction.*—The members of this class will meet individually with the instructor. To each student will be assigned the more important works of fiction and the biographies of two or more writers. Written reports will be required. Not less than 4,000 pages will be read. The final examination will cover not only the works read, but also the student's ability to read Spanish prose with ease and accuracy.

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*If any course continuing throughout the year is dropped before the end of the year, no credit is given for the work of the first half-year.

Prerequisites, Courses A, B and C. Students desiring this course must consult the instructor.

E. *Colloquial Spanish.*—Prerequisites, Spanish A, and B or C. Román y Salamero, *El castellano actual.* 1 hour. Given in alternate years: omitted in 1907-08.

ITALIAN LANGUAGE AND LITERATURE.*

PROFESSOR HILLS.

A. *Elementary Course.*—Grandgent's *Italian Grammar;* Bowen's *Italian Reader;* Goldoni, *Il vero amico;* Manzoni, *I promessi sposi.* 2 hours. Given in 1907-08. Students may not elect Italian A and Spanish A in the same year.

B. *Italian Literature of the Thirteenth and Fourteenth Centuries,* with an especial study of Petrarca and Dante. Lectures and collateral reading. 2 hours. Courses A and B are not given in the same year.

ECONOMICS.

PROFESSOR URDAHL.

A systematic course in the elements of Political Economy is followed by elective courses in special subjects.

A(1). *Elementary Economics.*—Required of all Juniors. A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, followed by lectures and assigned reading on the gen-

*If any course continuing throughout the year is dropped before the end of the year, no credit is given for the work of the first half-year.

eral principles of consumption, production, exchange and distribution. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law or journalism, the general rules and principles contributed to business by the science of economics. First half-year, 2 hours.

A(2). *Labor Problems.*—This course is designed to follow Course A(1). A study of some of the practical problems arising out of the relation of capital and labor, such as strikes, trades unions, arbitration, immigration, and child labor. Second half-year, 2 hours. Given in 1907-08 and every alternate year.

B. **Charities and Corrections.*—First, a series of lectures on the theory and history of charity and reformatory work; second, a study of the dependent class, with special reading on the slum conditions in our large American cities; third, a study of the delinquent class, the causes and prevention of crime, prison management and discipline. Charitable and correctional institutions in the vicinity will be visited, and special lectures will be given by men who have given special attention to some phase of these subjects. Second half-year, 3 hours. Omitted in 1907-08.

C. **Money and Banking.*—The history and theory of money, credit and banking. The evolution of metallic currency; the position of the Bimetallists and the Quantity Theorists; credit, credit instruments, paper money, convertible and inconvertible notes, modern currency problems and foreign banking systems are studied with special reference to American currency and banking. Lectures, recitations, reports and discussions. First half-year, 3 hours. Given in alternate years: omitted in 1907-08.

D. **Socialism.*—An historical and critical course in socialism and socialistic theory. Especial attention is paid to the historical basis of socialism, the French Revolution, the idealists, the German scientific socialists, the Christian socialists, the State

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*Prerequisite, Economics A(1).

socialism of today, and also to the various attempts at socialistic reforms. Lectures and recitations. First half-year, 3 hours. Given in 1907-08 and every alternate year.

E. **Colonial Policy.*—The theories of colonization and the economic ideas and institutions underlying the modern expansionist movement; a brief history of the colonial experiments of the great colonizing nations of the world: Spain, Portugal, Holland, France, England, Russia and Germany; a brief account of commercialism past and present, and of modern trade theories. Lectures and recitations supplemented by outside reading. First half-year, 2 hours.

F. *Economic and Social History of the United States.*—3 hours. Given in 1907-08 and every alternate year.

G. **Public Finance.*—A survey of the whole field of public finance, including (*a.*) public revenues, their nature, classification and characteristics, with special emphasis on taxation; (*b.*) public expenditures, their classification and relation to public welfare and to governmental functions; (*c.*) the budget and its preparation in the great countries of the world; (*d.*) public credit, its nature, employment, industrial effects and administration. Lectures, recitations and collateral reading in Adams', Seligman's and Ely's works. Second half-year, 3 hours. Omitted in 1907-08.

H. **Economic Theory.*—Designed for graduates and under-graduates who have had sufficient preparation. After a brief survey of the theories of rents, wages and profits advanced by the classical economists, the more recent theories are studied with special reference to Marshall, Clark and Patten, McFarlane, Bohn-Bawerk, etc. Second half-year, 3 hours.

I. **The Trust Movement in Europe.*—1 hour.

J. **Senior Seminary.*—Each student who takes his major in Economics, History, or Political Science, is required to prepare a thesis, in his Senior year, on a subject approved by the in-

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*Prerequisite, Economics A(1).

structor. This thesis must be typewritten and bound according to specifications furnished by the Librarian. After the thesis has been accepted by the instructor, it becomes the property of the College. While preparing the thesis, the student is required to meet the instructor at least once every week to report on work done and to discuss theory, bibliography, etc. 1 hour.

POLITICAL SCIENCE.**

PROFESSOR URDAHL.

A. *Historical Politics.*—The origin and growth of government from its primitive forms to the establishment of the modern states, the semi-amorphous horde, gentile society, the ancient city, the Athenian democracy, the Greek confederations, the Roman republic and empire, the Germanic folk, the feudal system, the political system of the church, the Holy Roman empire, the rise of national states, the development of absolute and constitutional monarchy, the growth of democracy, etc. Lectures supplemented by recitations and reports. Text: Wilson's *State.* First half-year, 3 hours. Given in 1907-08 and every alternate year.

B. *Comparative Politics.*—A study and comparison of the governments of the chief modern States; an exposition of the constitutional law of the United States and England and of their actual political organization. The great problems of federalism and centralization, presidential and responsible ministerial government, colonial government and civil liberty, receive especial consideration. Lectures, recitations and collateral reading. Second half-year, 3 hours. Given in 1907-08 and every alternate year.

**See Economics J.

HISTORY.**

PROFESSOR URDAHL.

A. *English History.*—Required of all Sophomores. The political history of England from the earliest times to the American Revolution. Recitations and collateral reading, supplemented by lectures on the constitutional and economic development. 2 hours.

B. **American History.*—A general survey, with emphasis on political and economic history. In special cases the course may be elected for one half-year. 3 hours.

(*a.*) First half-year: To the close of the Revolution.

(*b.*) Second half-year: From the Revolution to the present time.

C. **The Napoleonic Era and Modern Times.*—The history of Western Europe in the nineteenth century. Second half-year, 2 hours. Given in 1907-08 and every alternate year.

D. **Modern History to the French Revolution.*—History D and C constitute one continuous course. First half-year, 2 hours. Given in 1907-08 and every alternate year.

E. **Mediaeval History.*—A survey of the general history of Continental Europe through the period which lies between Ancient and Modern history. 2 hours. Given in alternate years: omitted in 1907-08.

G. **Seminary in American History.*—Open to graduates and undergraduates of sufficient preparation. For 1907-08 a special study will be made of the period 1840-1861. This work is a continuation of the investigation of the period 1830-1850 carried on by the class in 1905-06, and of the period 1815-1830

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*History A is a prerequisite to all history courses, except Greek H and Latin I.

**For courses in Greek and Roman History, see Greek H and Latin I. See also Economics J.

covered in 1904-05. A special study will be made of the following topics: (*a.*) The sub-treasury, the banks and the panic of 1839; (*b.*) The annexation of Texas, its consequences, and constitutional aspect; (*c.*) The abolition movement, slavery in the territories and slavery in its relation to international law; (*d.*) The compromise of 1850, its consequences and the Dred Scott decision; (*e.*) The secession movement and coercion; (*f.*) Abraham Lincoln and his party; (*g.*) The tariff, internal improvements, railroads, etc. The students are expected to exhaust the material within reach in all the local libraries. 3 hours.

LAW.

PROFESSOR URDAHL, MR. BABBITT, MR. HALL, MR. MCALLISTER, MR. WILLCOX.

The courses in Law are the equivalent of, and secure credit for, one year's work in the principal law schools of the country. The work has been arranged with a view to meeting the wants of students who, not intending to practice law, nevertheless desire a thorough foundation in the general principles on which Anglo-Saxon jurisprudence is based, as well as of those who intend to complete their studies and enter upon the practice of the profession.

A. *Elementary Law.*—A general view of the whole field of law and an introduction to its terminology and fundamental ideas. In addition to a careful study of a standard text-book the student is required to do collateral reading in Blackstone's and Kent's commentaries. First half-year, 3 hours.—PROFESSOR URDAHL.

B. *American Constitutional Law.*—The general principles of constitutional law of the United States, their interpretation and practical application; the origin and development of the written constitution in America. Recitations and lectures supplemented by a study of the leading cases on constitutional law. Second half-year, 3 hours.—PROFESSOR URDAHL.

C. *Contracts.*—Mutual assent and the necessity of its communication; offers and their expiration or revocation; necessity of consideration; requisites of contracts under seal; rights of beneficiaries and assignees; joint and several contracts; alternative contracts; conditional contracts; illegality; impossibility; duress; discharge of contracts, or causes of action arising under them by recession, novation, accord and satisfaction, release and other means. Texts: Anson on Contracts; Longwell and Williston's Cases on Contracts. 2 hours. Given in 1907-08 and every alternate year.—Mr. McAllister.

D. *Torts.*—The nature of torts; historical development; principles of liability; limitation of personal capacity; effect of a party's death; liability for the torts of agents and servants; general exceptions, inevitable accident, leave and license, necessity and self-defense; remedies; assault and battery; imprisonment; the family and business relation; defamation; wrongs of fraud and malice; wrongs to possession and property; trespass, waste, conversion, justification and excuse; nuisance; negligence, contributory negligence; special relations of contract and tort. Texts: Webb's Pollock on Torts; Ames and Smith's Cases on Torts. 2 hours. Given in alternate years: omitted in 1907-08.—Mr. O. B. Willcox.

E. *Domestic Relations and the Law of Persons.*—Infancy: period of infancy; voidable acts, disaffirmance, ratification; contracts for necessaries; obligations created or authorized by law; liability for tort; guardian and ward. Marriage: promise to marry; marriage contract at common law and under statutes; rights of husband and wife in each other's property; status of married women; transactions between husband and wife; torts affecting marital relations; separation; divorce. Parent and child: custody, service and earnings. Texts: Tiffany on Domestic Relations, Woodruff's Cases on Domestic Relations. 2 hours. Given in 1907-08 and every alternate year.

F. *Property.*—Real and personal property; ownership of land; natural servitudes; easements; covenants as to use; public rights; franchises; rents, tenures; uses and trusts; joint ownership; estates; remainders, executory limitations; common law as-

surances and conveyances under the Statute of Uses. Texts: 207 to 508, Chase's Blackstone; Gray's Cases on Property. 2 hours. Given in alternate years: omitted in 1907-08.—Mr. K. R. Babbitt.

G. *Mining Law.*—The mining laws of foreign countries; the policy of the United States, and Federal legislation concerning mineral lands; lands in the United States subject to appropriation under the mining laws, and the persons who may acquire rights therein; state legislation and local district regulations supplementing the Federal laws; the vein, apex, dip; the discovery, location and record of lode and placer claims; tunnel claims; coal lands, salines, mill sites; the nature and extent of property rights acquired by lode and placer locations; cross lodes, the extra-lateral right, known lodes; annual labor, abandonment, forfeiture, resumption of work, relocation; proceedings to obtain U. S. Patent, the adverse claim, action to determine adverse claims, the patent; actions and remedies; rights and obligations arising out of agreement between the parties. Texts: Lindley on Mines and selected cases. 1 hour. Given in 1907-08 and every alternate year.—Mr. O. B. Willcox.

MATHEMATICS.

Professor Cajori, Professor Loud, Mr. Birchby and Miss Hubbard.

A(1). *Algebra.*—Series; Variation; the Binomial Theorem; Logarithms. Undetermined Coefficients; Permutations and Combinations; Theory of Equations. First half-year 3 hours.

A(2). *Solid and Spherical Geometry.*—Planes and lines in Space; Polyhedra, the Cylinder, Cone and Sphere; Spherical Triangles. Second half-year, 2 hours.

A(3). *Plane Trigonometry.*—The functions of one and two angles; the solution of triangles; De Moivre's theorem; simple applications. Second half-year, 3 hours.

B(1). *Analytical Geometry (Elementary).*—Plane loci of first and second order. First half-year, 3 hours.

B(2). *Analytical Geometry (More Advanced).*—More thorough study of plane loci, some attention being given to modern methods. Second half-year, 2 hours.

C. *Calculus, Differential and Integral.*—First half-year, 3 hours. Second half-year, 4 hours.

D. *History and Logic of Mathematics.*—This course is planned especially for those who are fitting themselves to be teachers of Mathematics. One half-year, 2 hours.

E. **Projective Geometry.*—One half-year, 3 hours.

F. **Theory of Equations.*—One half-year, 3 hours.

G. **Differential Equations.*—One half-year, 2 hours.

H. **Determinants.*—One half-year, 2 hours.

J. *Theoretical Mechanics.*—Prerequisite, Course C. This course is intended especially for students of engineering and mathematical physics. 4 hours.

I. *Elementary Surveying.*—Field work and computation. Fee, $4. Second half-year: 8 hours, field work; 2 hours, recitation: counts 3 hours.

ASTRONOMY.

PROFESSOR LOUD.

A. *Elementary Astronomy.*—The descriptive, rather than the mathematical side of Astronomy, is emphasized. Text: Moulton's

*Of Courses E, F, G and H, only one is given in any one year.

Introduction to Astronomy. Essays are required. Second half-year, 4 hours.

B. *Observations and Computations.*—Prerequisite, Mathematics A (3). Astronomy A is recommended in preparation. The student is expected to make free use of the telescope and transit instrument, and to use his observations in the solution of simple problems. First half-year, 3 hours (including the observatory work counted as laboratory periods).

C. *Celestial Mechanics.*—The work of Moulton is used as a text-book. Prerequisite, Differential and Integral Calculus. First half-year, or throughout the year, 2 hours.

D. *Elementary Meteorology.*—Prerequisite, Elementary Physics. Text: Davis' *Elementary Meteorology.* Second half-year, 3 hours.

E. *Field Astronomy for Engineers.*—Comstock's work of this title is used as a text. First half-year, 3 hours.

F. *Stellar Photography.*—For this course the instruments of the Western Association for Stellar Photography,* at the station near Colorado Springs, are available. One half-year.

PHYSICS.

PROFESSOR SHEDD.

The aim of the courses offered in this department is: (1.) To give an elementary knowledge of the fundamental principles of the subjects studied. To this class belong courses A, B, and H. (2.) To give a working knowledge to those expecting to teach. For this purpose there are offered, on the theoretical side, courses C and G; on the experimental side, course D. (3.) To meet the needs of the student of pure science. To this class belong courses E and K.

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*See p. 117.

A. *General Physics* for candidates for the A. B. degree. Credit, 3 or 4 hours.

(1) Three lectures and one recitation a week. In these lectures the experimental and historical development of the subject will be emphasized. No mathematics is required beyond that necessary for entrance to College.

(2) Collateral reading or laboratory work. Those taking this course as the science requirement will be assigned laboratory work, one period of two hours a week.

B. *General Physics* for candidates for the A. B. degree. Prerequisite, Plane Trigonometry. Students preparing to teach Physics are advised to take this course. Credit, 4 hours.

(1) Three lectures and one recitation a week. In these lectures the mathematical development of the subject will be emphasized.

(2) Two periods of two hours each of laboratory work.
First half-year: Mechanics, Heat, Sound.
Second half-year: Light, Magnetism, Electricity.

H. *General Physics* for candidates for the S. B. degree. Similar to Course B, excepting that the experiments are selected especially for engineering students. Credit, 4 hours.

G. *Problem Work.*—Open to students who have taken or are taking A, B, or H. Credit, 1 or 2 hours.

C. *Theoretical Physics.*—Prerequisite, Course A or B. Credit, 2 hours.

First half-year.—Light, including geometrical and physical Optics, or theory of Heat.

Second half-year.—Theory of Alternating Currents, or Electricity and Magnetism.

D. *Practical Physics.*—Prerequisite, Course A or B. *Experiments in Mechanics.*—Study of the balance; Borda, Kater and Foucault Pendulums; elastic modulus by various methods; viscosity of liquids, soap films and Plateau figures; comparison of scales by comparator; hydrostatic pressures.

Experiments in Heat.—Calibration of thermometers by double points of H_2O and of other compounds; heat-equivalents of liquefaction and vaporization; relation of viscosity to temperature.

Experiments in Sound.—Vibration of wires; longitudinal waves; resonance of forks and air columns; Lissajous' and Meld's experiments.

Experiments in Optics.—Measurements of constants of mirrors; cardinal points of lenses; photometric measurements with Bunsen and Lummer-Brodhun photometers; study of the eye and its defects; study of diffraction patterns; spectrometer and interferometer work.

Experiments in Electricity and Magnetism.—Study of the Earth's field; temperature variations of magnets; wireless signals; X-ray work with the static machine, induction coil and Tesla coil; electrodynamic laws.

The credit in any of these subjects will depend upon the time spent in the laboratory, 2 hours a week counting as 1 hour.

E. *Advanced Physics.*—Prerequisite, Course B or H, and a knowledge of the calculus. Lectures on Physical Constants and Instruments of Precision and on the Magnetic Circuit. Collateral reading and papers on assigned subjects. Credit, 2 hours.

K. *Precise Measurements in Electricity and Magnetism.*—Prerequisite, Course B or H, and a knowledge of the calculus. I, E, and Q constants of galvanometers. Value of H of Earth's field. H, B curves for iron. Hysteresis loop, Comparison of E. M. F.'s, Measurement of Resistance, Capacity and Inductance. 4 hours' laboratory work a week. Credit, 2 hours.

NOTE.—In all laboratory courses a fee of $2.00 is charged for each credit of one hour for a half-year. In Courses A, B and H there is a laboratory-book fee of 25c each half-year.

CHEMISTRY.

PROFESSOR STRIEBY, PROFESSOR READ AND MR. STEWART.

A. *Elementary Chemistry.*—Text-book work (chiefly Inorganic Chemistry) supplemented by lectures and discussions upon the fundamental laws, the application of chemistry to sanitary science, medicine and some of the arts, and also by occasional papers from descriptions in technical books, and by reports of visits to metallurgical and manufacturing establishments. Remsen's *College Chemistry.* 3 hours' recitation and 4 hours' laboratory work (counts 3 hours).

B. *Advanced Chemistry.*—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. 3 hours' recitation or lectures and 4 hours of laboratory work (counts 3 hours).

C. *Qualitative Analysis.*—Prerequisite, Chemistry A or equivalent. Experimental drill in obtaining characteristic reactions of the more common elements, study of empirical formulæ and symbolic expression of reactions, solution of substances, separation of groups of elements, and finally analysis—first of simple salts and later of complex mixtures. The analytical work is confined almost wholly to inorganic substances, but includes certain common organic acids and a few organic bodies of general and medicinal use. 9 hours (counts 4).

D. *Quantitative Analysis.*—Prerequisite, Chemistry C. The laboratory work comprises determinations of single elements by approved methods, gravimetric and volumetric, followed by

the analysis of selected salts, ores, slags, mineral water and commercial products. A few rapid or commercial determinations are given as the final work. The lectures treat of the methods of analysis, properties of precipitates, stoichiometry, sampling, reporting and the theory of solutions. The laboratory work occupies 3 consecutive hours 4 days a week (counts 4 hours). Cairn's *Quantitative Analysis.*

E. *Organic Chemistry.*—Prerequisite, Chemistry A or B. Remsen's *Organic Chemistry.* Lectures and discussions of special subjects and processes. 3 hours' recitation and 3 hours' laboratory work (counts 3 hours).

F. *Theoretical Chemistry.*—Prerequisite, Chemistry B. Text-book work with lectures and oral and written discussions. 3 hours.

G. *Medical Chemistry.*—Prerequisite, Chemistry B. Lectures, text-book, assigned reading and laboratory work. The study is mainly of substances, inorganic and organic, that are of importance in medical science and hygiene. Especial attention is devoted to the analysis of urine, water, milk, metallic poisons, and the use of disinfectants. The needful gravimetric determinations, considerable volumetric work with burettes and standard solutions, and microscopic and spectroscopic tests, supplement the usual qualitative examinations. 4 hours' recitation, 4 hours' laboratory work (counts 4 hours).

H. *Agricultural Chemistry.*—Prerequisite, Chemistry B. A study of soils, fertilizers, foods and feeding; the analysis of soils, manures, water and dairy products. 3 hours.

The fee for every course must be paid in advance. It covers the cost of gas, chemicals and non-returnable supplies, except platinum. Glassware and necessary apparatus (except platinum vessels) are loaned to the student and must be returned in good condition. The fees are as follows:

Course A	$7.00
Course B	8.00
Course C or D, each year's work	15.00
Course E or G	15.00

BIOLOGY.

PROFESSOR SCHNEIDER AND MR. SCLATER.

A. *General Biology.*—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution.

First half-year: *Plant Studies.*—In the laboratory a comparative study is made of the cryptogams, beginning with the simplest forms. This is followed by a study of the structure of typical flowering plants.

Second half-year: *Animal Studies.*—The laboratory work involves a study of representatives of the principal groups of animals.

Recitations or lectures, 2 hours; laboratory work, 4 hours (counts 3 hours).

B. *Zoology.*—Prerequisite, Biology A. Lectures and recitations on the History of Zoology, Systematic Zoology, Morphology, and Embryology. Dissection of various classes and orders of animals up to chordata, with careful microscopic study of the finer structures. Recitations, 2 hours; laboratory work, 4 hours (counts 3 hours).

C. *Physiology.*—Prerequisites, Biology A and one year of Chemistry. Lectures, recitations and practical work by the student. The experimental work covers the following subjects: The physiology of ciliary motion; the general physiology of muscle and nerve tissue; phenomena of circulation, with countings of the blood-corpuscles and estimation of hæmoglobin; respiratory exchanges, movements, etc.; digestion and absorption; physiology of the spinal cord and brain; of the cutaneous sensations, taste, smell, hearing and vision. Some time is also given to lectures, with demonstrations, on the physiological action of the more important poisons. Recitations or lectures, 2 hours; laboratory work, 4 hours (counts 3 hours).

D.** *Comparative Anatomy of Vertebrates.*—Prerequisite, Biology A. Careful dissection of the Amphioxus, Cyclostome, Fish, Amphibian, Reptile and Bird. Lectures, collateral reading, and recitations. First half-year, 6 hours (counts 3 hours).

E.** *Mammalian Anatomy.*—Prerequisite, Biology A. The work is based upon a detailed dissection of the cat. Other material is used to illustrate the anatomy of special organs. Lectures and collateral reading. Second half-year, 6 hours (counts 3 hours).

F.* *Histology.*—Prerequisite, Biology A. A comparative detailed study of the tissues of the higher animals. Preparations of the principal tissues and organs are made and the common methods of preparation and mounting studied. Special microscopic drill is given in distinguishing the different tissues and organs. First half-year, 6 hours (counts 3 hours).

G.* *Embryology and Cytology.*—Prerequisite, Biology F. A study of maturation, fertilization and cleavage of the ovum, early stages of the embryology of the chick and frog. Special attention is given to the differentiation and development of tissues and organs. Students make most of their own preparations. Second half-year, 6 hours (counts 3 hours).

H.** *Bacteriology.*—Prerequisite, Biology A. Apparatus; culture media and methods of preparation; sterilization methods; microscopic characteristics of cultures of bacteria in general and of special forms and methods of diagnosis; methods of obtaining pure cultures; methods of staining; bacteriological investigations of water, air, and soil. Students electing this course are expected to take Biology I. 5 hours (counts 2 hours).

I. *Sanitary Science and Public Health.*—A lecture course. Some

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*Courses F, G, J and K will be offered in 1907-08 and alternate years.

**Courses D, E and H will be offered in 1908-09 and alternate years.

of the topics discussed are: Death and its causes; classification of diseases; ancient and modern theories of disease; germ theory of infectious disease; direct causes and predisposing causes of disease; means of avoiding and resisting disease; vehicles of disease, such as dust, sewage, water, etc.; brief sketch of the important transmissible and epidemic diseases, prophylaxis, etc. 1 hour.

J.* *Plant Physiology.*—Prerequisites, Biology A and one year of Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First half-year, 5 hours (counts 2 hours).

K.* *Systematic Botany—Seed Plants.*—Prerequisite, Biology A. Lectures on the principles of classification. A study of local flora is made, including the collection and determination of flowering plants. Some time is devoted to a study of the structural adaptations of plants to their surroundings. Second half-year, 3 hours.

Laboratory Fees: Course A, $2.50; Course B, C or H, $4.00; Course D, F, G or J, $3.00; Course E or K, $2.00.

GEOLOGY.

Professor Finlay.

A. *General Geology.*—Prerequisite, Elementary Chemistry. Dynamical, Structural and Historical Geology. Lectures, laboratory work Tuesday and Thursday afternoons, and field excursions on Saturday mornings. The student, while not required to do so, is advised to elect Mineralogy and Zoology before taking Geology, or at the same time with it. Texts:

*Courses F, G, J and K will be offered in 1907-08 and alternate years.

Chamberlin and Salisbury's *Geology,* Scott's *Introduction to Geology.* 3 hours.

B. *Mineralogy.*—Prerequisite, Elementary Chemistry. Required for Courses E and H. The economic or ore classification of minerals is used and the time is devoted chiefly to laboratory work in Descriptive and Determinative Mineralogy. Text: Moses and Parson's *Mineralogy, Crystallography and Blowpipe Analysis.* Laboratory fee, $3.00. Uniform individual working outfits are furnished at cost. 6 hours (counts 3 hours).

E. *Economic Geology.*—Prerequisites, Courses A and B. Lectures and required reading. The geology and mineralogy of the ore deposits of the United States, gold, silver, copper, lead, zinc, iron. The greater part of the second half-year is devoted to the consideration of coal, building stones, and the less imimportant non-metallic minerals. In the spring there are voluntary field excursions to mining localities. Texts: Kemp's *Ore Deposits of the United States and Canada,* Kemp's *Economic Geology of the Non-metallic Minerals.* 3 hours.

F. *Invertebrate Paleontology.*—Lectures and laboratory work. Systematic study of the chief classes of the invertebrates by means of fossils, with special attention to the structure and development of the trilobites and brachiopods. Collections are made in the field to afford training in the identification of geological horizons. First half-year, 3 hours. Given in alternate years: omitted in 1907-08.

G. *Vertebrate Paleontology.*—Lectures, laboratory work on the museum collections and required reading on the main lines of mammalian descent from the Eocene to recent time. First half-year, 3 hours. Given in 1907-08 and alternate years.

H. *Petrography.*—Prerequisites, Courses A and B. Lectures and laboratory work with the microscope on the commoner rock-forming minerals and the principal rock types. Second half-year, 3 hours.

I. *Field Geology.*—The systematic investigation in the field of 150 square miles immediately adjacent to Colorado Springs with

the preparation of maps and a report. Individual work under the guidance of the instructor.

BIBLE STUDY.

PROFESSOR PARSONS AND ASSISTANT PROFESSOR SMITH.

A. *Biblical Introduction.*—An information course in the contents and the general historical and literary setting of the books of the Bible. 1 hour.—ASSISTANT PROFESSOR SMITH.

B. *The History and Literature of the Hebrew People: Pre-exilic.* Not open to Freshmen. 2 hours.—ASSISTANT PROFESSOR SMITH.

C. *The History and Literature of the Hebrew People: Post-exilic.* Prerequisite, Course B. 2 hours.—ASSISTANT PROFESSOR SMITH.

D. *New Testament Introduction.*—Not open to Freshmen. Not given in 1907-08.—ASSISTANT PROFESSOR SMITH.

E. *The Life of Christ.*—2 years, 1 hour.—PROFESSOR PARSONS.

F. *The Life of Paul.*—1 hour. Not given in 1907-09.—PROFESSOR PARSONS.

NOTE.—For a course in New Testament Greek, see Greek I.

MUSIC.

For courses in Music see pp. 105-106. Course A only is counted towards a degree. Courses in Music are not included in the regular tuition fee.

Students of Music register with the Dean of the School of Music.

Honors and Scholarships Awarded at Commencement, 1906

High Honors.

Mabel Sylinda Bateman, 1907.
Carl Arthur Hedblom, 1907.
Ida Margaret Johnson, 1909.
Montgomery Rochester Smith, 1907.

Honors.

Jean Muriel Auld, 1908.
Philip Fitch, 1906.
Ruth H. Frothingham, 1908.
Rhoda Norton Haynes, 1908.
Violet Louise Holcomb, 1906.
John MacArthur Maguire, 1908.
Ethel Clara Norton, 1909.
Harold DeWitt Roberts, 1908.
Marie Antoinette Sahm, 1907.
Julia Faith Skinner, 1908.
Laura V. Tanner, 1907.

Perkins Scholars.

Harvey Ezra Boatright, 1907.
Lester McGunther Bonham, 1908.
Julia Faith Skinner, 1908.

Mary G. Slocum Scholar.

Carl Arthur Hedblom, 1907.

College Women's Club Scholar.

Jean Muriel Auld, 1908.

The Master's Degree

The Master's degree is conferred subject to the following conditions:

(1) The applicant must have received the Bachelor's degree from some reputable college or university.

(2) If the applicant becomes a resident student of Colorado College, he must pursue a minimum course of nine hours of advanced work a week for one year. The work shall include both a major and a minor subject, and at least five hours a week shall be taken in the major subject. In addition, the applicant must present a satisfactory thesis on a subject approved by the Faculty, such thesis to represent the equivalent of at least three hours of lectures a week for one year.

(3) In case of non-residence, the applicant must select a major and a minor subject, and complete a minimum requirement equivalent to twelve hours of lectures a week for one year, of which the equivalent of seven hours must be in the major subject, and at least two academic years must elapse before the degree is conferred. A thesis is required, as in the case of the resident student.

The thesis must be presented to the Faculty not later than May 15. It must be typewritten on paper of a prescribed size, and a copy deposited with the College librarian.

The latest date of registration for post-graduate students is October 15.

The fees are $30 a year for tuition, $5 for the diploma, and $1 to bind the thesis.

Applications for the Master's degree should be sent to the Chairman of the Faculty Committee on Post-Graduate Degrees, who will furnish information about courses.

School of Engineering

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D. (Amherst).
President.

FLORIAN CAJORI, Ph. D. (Tulane).
Dean and Head Professor of Mathematics.

LOUIS A. E. AHLERS, A. M. (Harvard).
Head Professor of the Germanic Languages and Literatures.

J. ROY ARMSTRONG, B. S. (Armour Institute).
Professor of Electrical Engineering.

CHARLES G. COLLAIS.
Superintendent of Mechanical Laboratories.

GEORGE IRVING FINLAY, Ph. D. (Columbia).
Professor of Geology, Mineralogy and Paleontology.

ELIJAH CLARENCE HILLS, Ph. D. (Colorado).
Head Professor of the Romance Languages and Literatures.

FRANK HERBERT LOUD, Ph. D. (Haverford).
Professor of Mathematics and Astronomy.

GEORGE J. LYON, C. E. (Columbia).
Professor of Civil Engineering.

HOWARD MOORE, C. E. (Princeton).

Assistant Professor of Graphics.

SIDNEY F. PATTISON, A. B. (Williams).

Professor of English.

THOMAS T. READ, E. M., Ph. D. (Columbia).

Professor of Mining and Metallurgy.

JOHN CUTLER SHEDD, Ph. D. (Wisconsin).

Professor of Physics.

WILLIAM STRIEBY, A. M., E. M. (Columbia).

Professor of Chemistry and Metallurgy.

ORGANIZATION OF THE SCHOOL.

The present rapid development of Colorado and the West created so imperative a demand for instruction in pure and applied science that in 1902 the Trustees of Colorado College decided to add to its existing departments a School of Engineering. Colorado Springs is admirably situated for such a school. The suburban electric railway takes the student to three different plants for the reduction of ore; the mines of Cripple Creek and the metallurgical works of Pueblo are near by; there are in the neighborhood fine examples of mountain railway construction and large electric plants with machinery of modern type. The Hydro-electric Company has now completed its power plant near Manitou, in utilization of a head of water the highest ever developed in hydraulic engineering. By careful study of local engineering problems and by close contact with the engineering establishments of this vicinity, it will be possible to secure a thorough blending of theoretical and practical instruction.

REQUIREMENTS FOR ADMISSION.

(16 units.)

The requirements for admission to the engineering courses are as follows:

1. Mathematics (3 units)—(*a.*) Algebra through simultaneous quadratic equations; (*b.*) Elementary Plane Geometry; (*c.*) Solid and Spherical Geometry; (*d.*) Review Algebra, Ratio and Proportion, Binomial Theorem, Arithmetical and Geometrical Progressions, Elements of Permutations and Combinations. Plane Trigonometry is desirable, but not necessary. A thorough preparation is of great importance.

2. Physics (1 unit)—One year's course. See p. 23.

3. Chemistry (1 unit)—One year's course. See p. 24.

4. Biology (1 unit)—One year's course. In place of Biology may be substituted an equivalent amount of Botany, Physiology, Physiography, or Geology, any two of these to be counted the equivalent of Biology. See p. 24.

5. English (3 units)—As in the College of Liberal Arts. See p. 20.

6. Foreign Languages (2 units)—Two years. See pp. 22-23.

7. American, and English or Ancient History (2 units)—One year's course in each. See p. 21.

8. Electives (3 units)—Preferably in modern languages. See p. 19.

DEGREE.

At the completion of an engineering course the student will receive the degree of Bachelor of Science, with a specific designation of the engineering course taken.

THESIS.

Each student is required to present, before graduation, a thesis on some engineering subject embodying investigations of his own.

SUMMER MEMOIR.

At the beginning of each of the last two years, a description of some engineering work, containing from three to five thousand words, is required of each student.

THE PIKE'S PEAK POLYTECHNIC SOCIETY.

The Pike's Peak Polytechnic Society, organized in 1904, has a large membership, composed of engineers of the Pike's Peak region. Its meetings are held in the Coburn Library, and the members have access to the engineering library of the College. Students of the School of Engineering are associate members of the society, and at its meetings enjoy the privilege of personal contact with prominent engineers.

ENGINEERING LIBRARY.

Since the opening of the Engineering School, much has been done in the accumulation of a library of technology. The first

acquisition consisted of the private library of the late Professor R. S. Miller, of Purdue University, which is particularly strong along the lines of mechanical engineering. A large number of new engineering books has been purchased, and a number of technical journals secured. Of the latter, the following are now at hand: A complete set of The Engineering Record (formerly called The Sanitary Engineer), of The Mineral Industry, of Van Nostrand's Engineering Magazine, and The Scientific American; nearly a complete set of The Scientific American Supplement; ninety-five volumes of the Minutes of the Institution of Civil Engineers of Great Britain, and the recent volumes of the Engineering Magazine, Cassier's Magazine, Engineering News, Engineering and Mining Journal, Electrical World, Electrical Engineer, Electrical World and Engineer, Electrician (London), Technology Quarterly, Municipal Engineering, American Machinist, Journal of the Franklin Institute; the current numbers of Ores and Metals, Mining Industry, Chemical News, Journal of the American Chemical Society and Fresenius Zeitschrift; the recent transactions of the American Institute of Mining Engineers, the American Institute of Electrical Engineers, the American Society of Civil Engineers, the American Society of Mechanical Engineers. The library has also the reports of the (Colorado) State Engineer, the United States Geological Survey, the United States Coast Survey, the United States Chief Engineer, the United States Chief of Ordnance, as well as the United States Publications on Irrigation. In addition, over twenty other engineering journals, taken by the Pike's Peak Polytechnic Society, are at the disposal of the faculty and engineering students. Altogether the list of journals within reach of the students is large. Some important engineering books and journals have been received as donations. Captain L. E. Berthoud, of Golden, Henry Hine and George C. Hewett, of Colorado Springs, gave several volumes; Mr. M. Kirkman, of Chicago, gave a complete set of his "Science of Railways"; Mr. John Herron, of Telluride, gave fourteen volumes of the Transactions of the American Society of Civil Engineers and six volumes of the Journal of the Association of Engineering Societies. Mr. B. H. Bryant has loaned the College, for the use of the Engineering School and the Pike's Peak Polytechnic Society, twenty-six volumes of the Engineering News, twelve volumes of the Railroad Gazette and other publications, amounting to over one hundred volumes. Mrs. Walter

B. Wilson donated Hayden's Atlas and other works. From the Armour Institute the library received a complete set of Modern Engineering Practice.

LABORATORIES AND EQUIPMENT.

The Physical Laboratory. See p. 112.

The Chemical Laboratory. See p. 113.

The Mechanical Laboratories.—It is desirable that engineering students should acquire some practical knowledge in carpentry, wood turning, pattern-making, blacksmithing, tool-making, machinists' bench and vise work, and in the handling of machine tools. To carry on this work there have been fitted out three laboratories, supplied with heat and electric light.

1. *Wood Laboratory.*—This is equipped with heavy maple-top cabinet benches, each having a tool cabinet furnished with the best make of tools, comprising Bailey planes, Buck Brothers' chisels, Disston saws, etc. Six wood-turning lathes of 14-inch swing have been added recently to the equipment of the pattern-making department, making in all twelve lathes for this work. The laboratory has also a 32-inch band saw, a table saw, hand saws, planes, clamps, hand screws and tool-sharpening machinery.

2. *Forging Laboratory.*—This is furnished with Buffalo iron blast forges, connected with Sturtevant blast and suction fans, anvils, swage blocks, tools, benches, vises, lockers, etc.

3. *Iron Laboratory.*—This is equipped with machinists' benches, bulldog vises, and drawers containing individual sets of tools; with two Bradford engine lathes an E. E. Ried screw-cutting lathe, a shaper, a Cincinnati universal milling machine with various attachments including a dividing head; a Greenfield universal tool and cutter grinder, adapted for grinding to size straight, and taper arbors, conical or cylindrical work, internal sizing,

reamers of various kinds, milling cutters, taps and dies, countersinks and counterbores, etc.; a large and small drillpress, an emery grinder, a machine hacksaw, and grinding machinery. Several different kinds of micrometers, face plate for finishing surfaces, and large steel machinists' rules, etc., are useful in advanced work. As need arises other equipment will be added to this and the other mechanical laboratories. The power in the mechanical laboratories is supplied by a 20-h. p. Chandler and Taylor engine.

The Testing Laboratory contains a 100,000-pound Riehle testing machine, by means of which experiments are made upon the materials of construction. In addition to other accessory apparatus, a Henning extensometer is available for tensile tests, and an Olsen compression micrometer for compression tests. Each of these instruments reads to one ten-thousandth of an inch. Commercial tests are being made for local manufacturers and others. In addition to being brought into touch with this practical work, each student is required to make a series of tests upon the resisting properties of wood, brick, concrete, stone, wrought iron, cast iron and steel.

The Cement Testing Laboratory is equipped with a Fairbanks testing machine, sand and cement sieves, briquette moulds, Gilmore's needles, as well as the necessary tanks and other apparatus requisite for investigations in the nature and physical properties of cement and cement mortars. All students are required to make and test briquettes of cement and cement mortar, as well as to determine the weight, fineness and other physical properties of such cement, sand, and mortar as may be assigned to them for examination.

The Hydraulic Laboratory is in the basement of Cutler Hall. It has a floor space of 1,200 square feet, and is furnished with an ample supply of water. It is equipped with a calibrated tank of 1,500 gallons capacity, weirs of different shapes and sizes, and with a variety of orifices for the purpose of determining hydraulic constants; with apparatus for experiments in con-

nection with the flow of water through pipes; with a Venturi meter and a series of displacement meters including one each of the piston, rotary and disc types; with pressure guages, differential guages, thermometers, etc., as well as with the portable tanks and scales usually found in such laboratories. There is also a twelve-inch Doble impulse wheel designed especially for laboratory purposes. This wheel is made with an adjustable nozzle, and furnished with a glass casing instead of the usual metal one, so that the action of the jet may be seen.

The Assay Laboratory is equipped with twenty-two muffle furnaces for solid fuel, and crucible and muffle furnaces for gasoline; also a large furnace of reverberatory type for handling a large number of fusions at one time; ore bins, fuel bins, two power crushers, steel sampling floor and table; twelve new pulp balances and several button balances, including two of the highest grade made by Ainsworth, of Denver. It is also supplied with a large number of checked ore samples of various grades and kinds, many of them donated by the American Smelting and Refining Company, the Ohio and Colorado Smelting and Refining Company, the United States Reduction and Refining Company, the Portland Mining and Milling Company, the Elkton Mining Company, Mr. E. C. Woodward and others.

The Metallurgical Laboratory equipment includes a reverberatory furnace for roasting and smelting, a set of iron kettles for desilverizing base bullion, tanks for cyanide and lixiviation tests of gold and silver ores, a grinding and amalgamation pan, apparatus for microscopical study of metals, furnaces for experiments in fusibility and heat treatment, Fery radiation pyrometer, Le Chatelier pyrometers (platinum-rhodioplatinum couple and copper-constantan couple), and a calorimeter.

The Mining (Ore-Dressing) Laboratory contains a Dodge Crusher, sample grinder, crushing rolls, screens, jig, hydraulic classifiers, a Wilfley concentrating table, etc.

The Electrical Laboratory.—Besides the apparatus in the Physical Laboratory proper, the School has the following equipment

for electrical engineering: Two 100,000-ohm, high-resistance boxes (German make), two 5,000-ohm boxes of high-current capacity (German make), Western Union test set, portable test box, model K test set, Whitney test set, four box bridges, Rowland D'Arsonval galvanometer, four Wall D'Arsonval galvanometers, ballistic galvanometer, eight-coil astatic galvanometer, four-coil Green astatic galvanometers, two Thomson controlling magnet galvanometers, two Weston galvanometers, dial faradmeter, universal ohmmeter and faradmeter, three Ayrton universal shunt boxes, Cardew hot wire volt meter, two Thomson inclined coil voltmeters, three Thomson inclined coil ammeters, three Thomson inclined coil wattmeters, two Weston direct current voltmeters, three Weston direct current ammeters, Weston standard laboratory voltmeter, Weston milli-voltmeter, Weston mil-ammeter, Weston direct current wattmeter, Weston volt-ammeter, Hopkinson's yoke permeameter, Rowland magnetizing ring, two fixed standards of self-induction, bridge for determining small inductances, standard of induction with secondary, resistance thermometer, three-meter optical bench with Lummer-Brodhun screen, secohmmeter, four electro-dynamometers, wattmeter dynamometer, four torsional voltmeters and volt boxes, a Thomson-Rice arc ammeter, a National potential indicator, a stand ammeter, a Thomson-Houston ground detector, a Westinghouse ammeter, a Westinghouse voltmeter, an Edison ammeter, a Westinghouse compensator, a General Electric lighting arrester, two Shallenberger wattmeters, a variable potential rheostat, speed tachometer, sub-divided condensers for experimentation on capacity, two 5 k. w. out-door-type transformers of the General Electric Company, and an alternating current curve-tracer.

Direct current dynamos are represented by two 15 k. w. General Electric direct-connected 110 volt generators, one 30 k. w. General Electric direct-connected 110 volt generator. These three generators are connected with a switch-board allowing the study of single and parallel operation. There is also one 2 k. w. La Roche Ideal exciter generator, one ten-light 110 volt Fidelity generator, ½ h. p. H. J. Evans Special D. C. generator.

Direct current motors are represented by the following machines: Two 15 h. p. Sprague street car 500 volt motors (presented by the Rapid Transit Company of Colorado Springs), ½ h. p. 14 pole Ft. Wayne-Wood motor, ½ h. p. Excelsior arc-motor, 52 volt Emerson motor, 25 h. p. General Electric 110 volt motor, 15 h. p. Thomson-Houston 110 volt motor, small Westinghouse fan motor, 2 h. p. Lundell motor, and a 5 h. p. compound wound motor of the Crocker Wheeler Company.

Alternating current machinery is represented by a La Roche arc and two special alternators, 125 cycles 25 k. w. 2000 volts or 60 cycles 15 k. w. 1000 volts (the armature is composed of two parts such that a mechanical displacement of phase from 0 to 90 degrees may be obtained), small A. C. Wagner induction motor, small General Electric induction hand start motor, two ½ h. p. Emerson induction fan motors, 1½ k. w. 60 cycle Maloney transformer (presented by the Maloney Transformer Co. of St. Louis), ten-light Stanley, Type C transformer. A 25 h. p. oil engine and 15 k. w. 220 volt generator have been donated to this department by General Palmer.

The Photometric Laboratory is equipped with a three-meter photometer bench and Lummer-Brodhun screen. Measurements of horizontal and spherical candle power, as well as comparisons of lamps with standard lamps, can be made.

The Calibration Laboratory is equipped with the necessary apparatus for accurately calibrating instruments of all kinds under various conditions of current voltage and power factor of alternating current.

The Experimental Engineering Laboratory has one horizontal and three vertical steam engines, four boilers, boiler feed pumps, auxiliary apparatus of the power plant, ventilating fans, hoisting blocks, etc., for making various commercial mechanical tests, such as boiler pressure tests, efficiency tests of all kinds, steam indicator diagrams and valve settings of engines.

Surveying—The School possesses a good working equipment of engineers' field instruments, including transits, levels, a solar

attachment and a plane table, as well as smaller instruments and accessories. Each student is required to learn the use and adjustment of the field instruments.

Lantern Slides and Photographs.—The School has a representative collection of lantern slides on steam engineering, machine design, metallurgy and electrical engineering, and blue prints and photographs of various engineering structures. The electrical drafting room contains a complete reference library of catalogues and blue prints of all the important steam engines, pumps, boilers, blowers, dynamo machinery, etc.

Geometrical Models.—For illustrating subjects in Descriptive Geometry and Graphic Statics there are in the Drafting Room a number of models prepared by students. The collection includes half a dozen thread models of ruled surfaces. In the mathematical class-room there are a number of models of wood and of plaster of Paris.

Courses

MINING ENGINEERING.

The course in mining engineering is designed to give a thorough grounding in the theoretical principles upon which the successful practice of mining and metallurgy must rest, to create in the student the habit of investigation, and to familiarize him with current and past practice, especially that in successful up-to-date plants. With this in view there are included, in addition to the courses in mining, metallurgy and geology, thorough courses in mathematics, physics, chemistry, theoretical and applied mechanics, and briefer courses in steam and electrical engineering, surveying and mining law. In order that theory may go hand in hand with practice, the students in this course are aided and encouraged to work during the summer vacations at representative mining and metallurgical plants and are required to hand in a detailed memoir covering the work in which they have engaged. The instruction in the course is illustrated by models, charts and diagrams, and also by visits to near-by plants, where the processes in use are fully explained, working sketches of the plant and machinery are made, and criticisms of the methods employed are suggested. For this the school is admirably situated, as three modern reduction works, employing as many different processes, are within a half hours' ride, and within easy reaching distance are the mines and mills of the Cripple Creek district. Before graduation, the students are required to hand in a thesis embodying a detailed investigation into some metallurgical or mining problem, usually one of present importance in the industry. The ability to do original work, thus acquired, is of the greatest value.

FRESHMAN YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Algebra (Math. A1) p. 50	4	Trigonometry (Mathematics A3) p. 51	4
Advanced Chemistry (Chem. B) p. 55	7	Descriptive Geometry (Graphics B)	8
Drawing (Graphics A)	6		

FRESHMAN YEAR—*Continued.*

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Woodwork (Shop work A)	6	Advanced Chemistry (Chem. B) p. 55	7
Rhetoric and Composition (English B) p. 35	3	Elem. Surveying (Civil Eng. A)	8
Modern Language	3	Rhetoric and Comp. (Eng. B)	3
Descriptive Geometry (Graphics B)	1	Modern Language	3

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	3	Analytical Geometry (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Qualitative Analysis (Chem. C)	9	Quantitative Analysis (Chem. D)	9
Gen. Physics (Phy. H)	7	Gen. Physics (Phy. H)	7
Mineralogy (Geol. B)	6	Mineralogy (Geol. B)	6
Machine Design (Graphics C)	4	Modern Language	2
Modern Language	2	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
General Geology (Geol. A)	3	Testing Laboratory	3
Quant. Anal. (Chem. D)	12	General Geology (Geol. A)	3
Mine Surveying (C. E. AM)	5	Assaying (Met. A)	9
Masonry Structures (C. E. E.)	2	General Metallurgy (Met. B)	1
Power Plants (Elect. Eng. Q)	2	Met. of Copper (Met. C)	3
		Mining A	3
		Power Plants (Elect. Eng. Q)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Economic Geology (Geol. E)	3	Economic Geology (Geol. E)	3
Hydraulics (Civ. Eng. H)	2	Petrography (Geol. H)	6
Ore Dressing (Mining C)	3	Mine Plant and Equipment (Mining D)	3
Mining B	2	Electrical Machinery (Elect. Eng. P)	2
Electrical Machinery (Elect. Eng. P)	2	Met. of Iron and Steel (Met. G)	2
Met. of Lead (Met. D)	2	Advanced Metallurgy (Met. H)	1
Met. of Gold (Met. E)	2	Mine Administration (Mining E)	1
Met. of Silver (Met. F)	1	Thesis.	
Mining Law	1		
Mining Laboratory (Mining F) afternoons for 3 weeks.			
Met. Laboratory (Met. I) afternoons for 3 weeks.			
Thesis.			

CIVIL ENGINEERING.

The four years' course leading to the degree of Bachelor of Science in Civil Engineering is designed to afford a thorough analytical training, as well as numerous and extended practical exercises in those matters that pertain to the profession of the civil engineer, including all kinds of structures and public works, and also the various developments and applications of power by the use of electric, steam, water and air motors.

The theoretical portion of the instruction is based largely upon the courses given in the departments of mathematics and physics, and the results obtained are applied to practical engineering work. Special stress is laid upon the design by the student of the various structures and machines which the civil engineer is called upon to construct in the practice of his profession.

The instruction is given by lectures, demonstrations by the student, and frequent conferences, co-ordinate with which the work of design is carried on. It covers comprehensively the subjects

of surveying, water supplies of cities and towns, irrigation, sanitary engineering, including sewage disposal, graphic and analytic treatment of all metallic structures, foundations, retaining and reservoir walls, high masonry dams, sewer systems, hydraulic engineering, rivers and harbors, hydraulic, steam and electric motors.

FRESHMAN YEAR.

As in the Mining Engineering Course.

SOPHOMORE YEAR

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	2	Analytical Geom. (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Gen'l Physics (Phys. H)	7	General Physics (Phys. H)	7
Mineralogy (Geol. B)	6	Petrography (Geol. H)	3
Machine Design (Graphics C)	4	Graphic Statics (Graphics D)	4
Modern Language	2	Modern Language	2
Field Astronomy (Astr. E)	3	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
Hydraulics (Civ. Eng. H)	2	Testing Laboratory	3
Power Plants (Elect. Eng. Q)	2	Theory of Trusses (Civ. Eng. C)	3
Masonry Structure (Civ. Eng. E)	2	Power Plants (Elect. Eng. Q)	2
Advanced Surveying (Civ. Eng. AA)	8	Railroad Surveying (Civ. Eng. G)	4
		Masonry Structures (Civ. Eng. E)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Foundations (Civ. Eng. F)	2	Design of Bridges and Buildings (Civ. Eng. D)	4
Design of Bridges and Buildings (Civ. Eng. D)	4	Irrigation (Civ. Eng. J)	2
Railroad Engineering (Civ. Eng. G)	4	Sanitary Engineering (Civ. Eng. K)	3
Water Supply (Civ. Eng. I)	3	Roads and Parks (Civ. Eng. L)	2
Elementary Law	3	Mining A	3
Electrical Machinery (Elect. Eng. P)	2	Electrical Machinery (Elect. Eng. P)	2
Thesis.		Thesis.	

IRRIGATION ENGINEERING.

In order to meet the demand for men trained in the design, location and construction of irrigation work, a special course in irrigation engineering is afforded. The first year of this course is the same as in the Civil Engineering course; the second, third and fourth years differ from the regular Civil Engineering course in the substitution of special work in agricultural chemistry, soil physics, advanced work in hydraulics, and the design of stone, timber and steel irrigation structures for those subjects that bear less directly upon irrigation problems. The full equipment of the Civil Engineering department, including surveying instruments, testing machines, hydraulic laboratory and maps and plans, is available to the students of Irrigation Engineering.

The course differs from that in Civil Engineering in the following respects:

SOPHOMORE YEAR.—Agricultural Chemistry (Chem. H) takes the place of Geology B during the first half-year and of Geology H during the second half-year, and Astronomy E is omitted.

JUNIOR YEAR.—During the second half-year Soil Physics and

Irrigation (Civ. Eng. J) take the place of Theory of Trusses (Civ. Eng. C) and Railroad Surveying (Civ. Eng. G), and Geology A replaces Power Plants (Elect. Eng. Q).

Senior Year.—During the first half-year Irrigation Law, Design of Irrigation Structures (Civ. Eng. O) and Hydraulic Engineering (Civ. Eng. N) take the place of Railroad Engineering (Civ. Eng. G) and Elementary Law. During the second half-year Hydraulic Engineering (Civ. Eng. N) and Agriculture take the place of Roads and Parks (Civ. Eng. L) and Mining A and Design of Irrigation Structures (Civ. Eng. O).

ELECTRICAL ENGINEERING.

The primary object of the course in Electrical Engineering is to develop an ability to solve electrical problems of a technical as well as of a commercial nature. The aim in the work is to give the student a broad foundation in the fundamental engineering principles, and then to secure practical familiarity with them by laboratory experimental work. The study of Electricity begins in the Sophomore year, when in the Physics course the basal laws of Electricity and Magnetism are mastered and the fundamental experiments performed in the laboratory.

The laboratory work embraces a detailed study of instruments, methods and electrical apparatus of modern practice both in direct and alternating currents.

Emphasis is laid on laboratory reports in which results of tests made by the students are discussed, both as to the theory and design of the machine under test and as to the applicability and accuracy of the method used.

The many plants in and about Colorado Springs afford unusual opportunity for the study of the application of electricity to long-

distance transmission, mining, smelting, street car service and city lighting.

FRESHMAN YEAR.

As in the Mining Engineering Course, except that Shop-work B takes the place of Surveying during the second half-year.

SOPHOMORE YEAR.

As in the Mining Engineering Course, except that Mineralogy (Geology B) will be replaced during the first half-year by Shop-work C and during the second half-year by Graphic Statics (Graphics D); and during the second half-year Shop C will be replaced by Shop D.

JUNIOR YEAR.

First Half-Year.	Hours per week.
Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3
Hydraulics (Civ. Eng. H)	2
Power Plants (Elect. Eng. Q)	2
Precise Measurements (Physics K)	2
Machine work and tool-making (Shop-work D)	6
Direct Current Machinery (Elect. Eng. A)	3
Chemistry I	2

Second Half-Year.	Hours per week.
Mathematics J	4
Civil Eng. B	2
Alternating Current Theory (Elect. Eng. B)	3
Elect. Eng. Q	2
Shop-work D	6
Elect. Laboratory (Elect. Eng. C)	3
Electrical Engineering Measurements (Elect. Eng. D)	2
Principles of Dynamo Design (Elect. Eng. E)	2
Electrical References (Elect. Eng. O)	2

SENIOR YEAR.

First Half-Year.	Hours per week.
Alternating Current Machinery (Elect. Eng. F)	3
Direct Current Laboratory (Elect. Eng. G)	3
Electrical Engineering Instruments (Elect. Eng. H)	1
Central Station Design (Elect. Eng. I)	6
Experimental Engineering (Elect. Eng. J)	3
Electrical References (Elect. Eng. O)	2
Elementary Law (Law A)	3
Thesis.	

Second Half-Year.	Hours per week.
Electrical Power Transmission (Elect. Eng. K)	3
Alternating Current Laboratory (Elect. Eng L)	3
Electrical Machinery (Elect. Eng. M)	6
Practical Electro-chemistry (Elect. Eng. N)	2
Electrical References (Elect. Eng. O)	2
Elect. Eng. H	1
Inspection Tours.	
Thesis.	

Departments of Instruction

MINING.

PROFESSOR READ.

A. *Excavation, Tunneling, Boring and Shaft-sinking.*—Excavation of rock and earth; explosives; drilling and blasting; driving and support of railroad tunnels; drilling, boring and shaft-sinking. Second half of Junior year for Mining Engineers and of Senior year for Civil Engineers, 3 hours.

B. *Mine Engineering.*—Prospecting; exploration, development, methods of working; surface handling and transportation; shipment and storage of minerals; drainage; water supply; ventilation and accidents. First half of Senior year, 2 hours.

C. *Ore Dressing.*—Crushing of ores by jaw crushers, rolls, gyratories, and stamps; sizing by screens, classifiers, etc.; sorting by jigs and on tables; slime treatment. First half of Senior year, 3 hours.

D. *Mine Plant and Equipment.*—Hoisting, drainage, ventilating and compressed air plants; machine drills; coal-cutting machinery; under-ground handling and haulage; ore bins; trestles; retaining walls; building materials. Second half of Senior year, 3 hours.

E. *Mine Administration.*—Organization and business management; mining and metallurgical accounts; cost of mining and metallurgical operations. Second half of Senior year, 1 hour.

F. *Mining Laboratory.*—Working tests; adjustments and operation of concentrating machinery. Senior year, afternoons for three weeks.

METALLURGY.

Professor Read.

A. *Assaying.*—Sampling and assaying of gold, silver, copper and lead ores, mattes and bullions. Lectures and laboratory practice. Second half of Junior year, three afternoons a week. Fee, $15.

B. *General Metallurgy.*—Fuels—solid, liquid, and gaseous; furnaces shaft and reverberatory; refractory materials; fluxes and slags; computation of furnace charges; general arrangement of plant. Second half of Junior year, 1 hour.

C. *Metallurgy of Copper.*—Ores of copper; roasting sulphide ores; smelting of metallic, oxide and sulphide ores; pyrite smelting, matte smelting; conversion of matte to blister; refining of barren blister; electrolytic refining of blister; recovery of gold and silver from slimes. Second half of Junior year, 3 hours.

D. *Metallurgy of Lead.*—Ores of lead; roasting, smelting in ore hearths, reverberatory and shaft furnaces; softening, desilverizing and refining of base bullion; parting of Doré bullion. First half of Senior year, 2 hours.

E. *Metallurgy of Gold.*—Recovery of gold from alluvial deposits; panning, sluicing, hydraulicking and dredging; stamping and

amalgamation of gold ores; general features of treatment of sulphide and telluride ores; fine grinding and cyaniding; bromo-cyaniding; chlorination. First half of Senior year, 2 hours.

F. *Metallurgy of Silver and the Minor Metals.*—Discussion of the methods of recovery of silver not given under copper and lead. Metallurgy of zinc, aluminum, nickel, cobalt, tin, mercury, etc. First half of Senior year, 1 hour.

G. *Metallurgy of Iron and Steel.*—Ores of iron; smelting; manufacture of white and grey pig, wrought iron, bessemer, open hearth, cement and crucible steels; constitution of cast irons and steels; physical and chemical properties, commercial and engineering specifications. Second half of Senior year, 2 hours.

H. *Advanced Metallurgy.*—Effect of heat treatment on metals; pyrometry; metallography; constitution of alloys. Second half of Senior year, 1 hour.

I. *Metallurgical Laboratory.*—Practice in the heat treatment of steels, roasting of ores, desilverizing of lead, cyaniding, chlorination and amalgamation. Senior year, afternoons for four weeks.

CIVIL AND IRRIGATION ENGINEERING.

Professor Lyon, Assistant Professor Moore and Assistants.

A. *Theory and Practice of Surveying.*—Construction, use and adjustment of instruments; pacing survey; contouring and levelling by hand level; theory of stadia measurements; azimuth traverse; balancing survey. 4 hours' credit, second half, Freshman year. 2 recitations and 2 afternoons' field or office work. *Required of Civil, Irrigation and Mining Engineers.* Fee, $4.

AA. *Advanced Surveying.*—Topographic, hydrographic, city and mining surveying. Instruments and field methods used in geodetic surveying. Simple, compound and reversed railroad

curves; turnouts and switches; theory of earthwork computations. 2 recitations and 6 hours of field or office work, first half, Junior year. *Required of Irrigation and Civil Engineers.* Fee, $4.

AM. An abridgement of Course AA, for Mining Engineers. 2 hours' recitation, and 3 hours' field or office work, first half of Junior year. Fee, $2.

B. *Resistance of Materials.*—Laws of elasticity in homogeneous materials; coefficients of elasticity; relations between stresses and strains; common theory of torsion and flexure; elastic limits, working stresses and ultimate resistances of wrought iron, cast iron, steel, alloys, timber, building stones, concrete and masonry; simple and continuous beams; design and construction of iron, steel, and timber columns and beams, including design of plate girders; shafts; cables, specifications. 3 hours' lectures and recitations during Junior year, with work in the cement and testing laboratory. *Required of all Engineers.* Fee, $4.

C. *Theory of Trusses.*—The truss element; simple, cantilever and noncontinuous trusses with parallel chords; fixed and moving loads; through and deck spans; position of any system of concentrated moving loads for greatest chord and web stresses, when chords are parallel and when they are not so; combination of analytical and graphic methods; skew and irregular trusses; application to bridge and roof trusses; arched ribs. 3 hours' credit, second half, Junior year. Lectures and recitations with problems and design work. *Required of Civil Engineers.*

D. *The Design and Construction of Bridges, Roofs and Buildings.*—Railway and highway bridges; pin and riveted connections; single and multiple systems of bracing; the design of details for bridges, roofs and buildings; floors for railway and highway bridges; design and operation of draw bridges, including engines, locking, lifting and turning machinery; cantilever structures; wind loads and stresses; single and double track viaducts or trestles in iron, steel and timber; complete

design of a railway bridge, with estimates of cost. 4 hours' credit, Senior year. Lectures, recitations and design work in the drafting room. *Required of Civil Engineers.*

E. *Masonry Structures.*—Cement, concrete and masonry; pressure and abutting power of earth; design and construction of retaining walls; stability of masonry structures, including towers and chimneys; theory and design of arches; theory and design of reservoir walls, earth and high masonry dams. 2 hours' credit, Junior year. Recitations, lectures and design work in the drafting room. *Required of Civil and Irrigation Engineers. Mining Engineers take first half of this course.*

F. *Foundations.*—Foundations for buildings; safe loads on masonry and foundation beds; examinations of foundation sites; pile driving and pile foundations; sheet-piling and cofferdam methods; pneumatic foundations and caisson work; open dredging; bridge piers of masonry and steel; piers for deep foundations; tunneling. 2 hours' credit, first half, Senior year. Lectures and design work. *Required of Civil and Irrigation Engineers.*

G. *Railroad Engineering.*—Reconnaissance; preliminary survey; location; cross-sections; transition-curves; earth-work computation; turnouts, yard and switch work; sources and value of train resistance; the relation of curvature and grades to velocity and maximum train load; effect of momentum; balance of grades for unequal traffic; analysis of operating expenses; cost of extra distance, curvature, rise and fall, and of additional trains; effect of road bed on cost of running trains; economic value of distance, curvature, rise and fall, and of grades; pusher grades; value of additional traffic; improvement of old lines; ordinary and extraordinary methods of drainage; water supply, its quality, storage and delivery; construction of wooden trestles and masonry culverts; standard plans; estimate of cost. 4 hours' credit, second half, Junior year and first half, Senior year. Lectures, recitations, field work, problems and design work. *Required of Civil Engineers.*

H. *Hydraulics.* Flow of water through orifices; time required for discharge of canal locks and similar volumes; weir discharge and gauging by weirs; gauging of water for irrigation systems; flow through and discharge of pipes; design of pipe systems; the Venturi meter; flow and discharge of open canals and rivers; gauging streams. 2 hours' credit, first half. Recitations and problem work. *Required of Junior Civil Engineers and of Senior Mining Engineers.*

I. *Water Supply.*—Rainfall and storage; flow of streams; influence of soils, elevation and geologic characteristics of water-shed; methods of supply; underground flow; reservoir construction; distributing systems; house-supply and wastage. 3 hours' credit, first half, Senior year. Recitations, collateral reading and design work. *Required of Civil and Irrigation Engineers.*

J. *Irrigation Engineering.*—Irrigation of land; amounts and periods of application; grades, cross-section and capacity of canals; surveys for irrigation works; source of water supply; hydrographic data; Colorado streams; return of seepage waters; irrigation by pumping. 2 hours' credit, second half. Lectures, recitations and assigned reading. *Required of Civil Engineers in Senior year, and of Irrigation Engineers in Junior year.*

K. *Sanitary Engineering.*—Treatment and disposal of sewage and refuse by sedimentation, precipitation and use of septic tanks; treatment of effluent by continuous and intermittent sand filtration; fertilization; disposal of sludge; sand filters; causes of pollution of potable water, and its purification by continuous and intermittent sand filtration; sewage and surface drainage of cities and towns; separate and combined systems of sewers; capacity of mains and branches; catch-basins, manholes; flush-tanks; outfalls; grades and sections; flow and discharge of sewers; construction. 3 hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil and Irrigation Engineers.*

L. *Roads, Pavements and Parks.*—Surveys and locations; drainage and grades; foundations; selection and treatment of ma-

terials; maintenance of roads and pavements; design, construction and maintenance of parks and parkways. Two hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil Engineers.*

N. *Hydraulic Engineering.*—Continuation of Course H. Collection and storage of water; analysis of hydrographic data with particular reference to Colorado and other western states; irrigation reports; organization and administration; pumps and pumping machinery; principles involved in the design of reservoirs, canals and irrigation structures. 2 hours' credit, Senior year. *Required of Irrigation Engineers.*

O. *Design of Irrigation Structures.*—Practical application in the drafting room of the principles studied in the courses in Hydraulic Engineering, Resistance of Materials, and Masonry Structures to actual design work. 4 hours' credit, Senior year. Study of plans of existing structures, conferences and design work. *Required of Irrigation Engineers.*

ELECTRICAL ENGINEERING.

PROFESSOR ARMSTRONG.

A. *Direct Current Machinery.*—Discussion of fundamental laws of electricity and magnetism, theory of the direct current dynamo and motor, the fundamental principles involved, study of characteristics of different types and their various applications. Text, Sheldon's *Direct Current Machinery.* First half of Junior year, 3 hours.

B. *Alternating Current and Transformer Theory.*—The various electrical quantities are discussed analytically and graphically; detailed study of efficiency, regulation, etc., of alternators and transformers and their vector diagrams under various conditions of load. Text, Sheldon's *Alternating Current Machinery.* Second half of Junior year, 3 hours.

C. *Electrical Laboratory.*—A laboratory course devoted to the study

of various types of laboratory and commercial instruments and electrical measurements. Fee, $3.00. Second half of Junior year, one afternoon.

D. *Electrical Engineering Measurements.*—A course of lectures on various commercial measurements, as applied to direct and alternating current machinery and systems. Second half of Junior year, 2 hours.

E. *Principles of Dynamo Design.*—A course of exercises on the discussion of materials of construction and method of windings with the electrical and magnetic calculations for direct current dynamos and for transformers. Text, S. P. Thompson's *Design of Dynamos.* Second half of Junior year, 2 hours.

F. *Alternating Current Machinery.*—The study of standard polyphase systems. The design and construction of alternating current apparatus, including single-phase, two-phase and three-phase alternators, synchronous and induction motors, rotary converters, and static transformers; and their operation both singly and in combination with each other. Text, Oudin's *Standard Polyphase Systems.* First half of Senior year, 3 hours.

G. *Direct Current Laboratory.*—The management and testing of direct current dynamos and motors. The work includes the ordinary tests of heating, efficiency, speed-regulation, parallel and three-wire-system operation. Fee, $3.00. First half of Senior year, one afternoon a week.

H. *Electrical Engineering Instruments.*—A course of lectures devoted to the consideration of various types of commercial measuring instruments for both direct and alternating current work: their general characteristics, accuracy and possible sources of error. Senior year, 1 hour.

I. *Central Station Design.*—This includes the calculation and design of a lighting, power or traction station. The student is given the site and must design a plant to fulfill the given conditions, cost of coal, water, price of land, etc. The sizes of engines, boilers, dynamos and accessory apparatus best fitted

for those conditions are calculated and the plant drawn to scale. First half of Senior year, 6 hours.

J. *Experimental Engineering.*—This course is designed to give the electrical engineer a conception of the principles of mechanical engineering. Standard tests of boilers, engines and pumps are made by the student. Fee, $3.00. First half of Senior year, one afternoon a week.

K. *Electrical Power Transmission.*—This work is a review of the preceding work combined with the study of generation, distribution, transmission and consumption of electrical energy. The problems of electric lighting, electric railways and long distance high voltage transmission are discussed. Second half of Senior year, 3 hours.

L. *Alternating Current Laboratory.*—A laboratory course. The testing and management of single and polyphase alternators and transformers; the experimental operation of various types of machines in combination. Fee, $3.00. Second half of Senior year, one afternoon.

M. *Electrical Machinery.*—This includes the design of a direct current dynamo based on the work in course J; and the design of a transformer to meet various conditions of transmission. Second half of Senior year, 6 hours.

N. *Practical Electro-chemistry.*—A course of lectures on theoretical and practical electro-chemical manufacturing. Second half of Senior year, 2 hours.

O. *Electrical References.*—A course of reference work in connection with the laboratory reports. Second half of Junior year and throughout Senior year, 2 hours.

P. *Electrical Machinery.*—This course is a digest of Courses A, B, C and D. *Required of all Civil, Mining and Irrigation Seniors.* Senior year, 2 hours.

Q. *Power Plants.*—Steam engines and their mechanism; mechanical features and construction of condensing, compound, and multiple expansion engines; engine valve gears; details of

construction; erection and setting; piping accessories; boilers and their construction; feed water heaters; pumps and secondary apparatus. General plans and design of building. Text, Hutton's *The Mechanical Engineering of Power Plants.* Junior year, 2 hours throughout the year. *Required of all Engineers.*

GRAPHICS.

ASSISTANT PROFESSOR MOORE.

Students are expected to devote more time to drawing, in the Freshman and Sophomore years, than the number of hours assigned in the schedule, but may do the extra work at such hours as suit their convenience.

Students in all engineering courses are expected to provide themselves with a good and complete set of drawing instruments—design and make to be approved by the instructor.

A. *Elements of Drawing.* This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right line and the bow-pen, conventional representations, mathematical curves, cycloidal and other motion curves, isometric, oblique and orthographic projections, working drawings, tracings, the form and proportions of standard letters, both freehand and ruled, methods of spacing and laying out titles. First half of Freshman year, 6 hours. *Required of all Engineers.*

B. *Descriptive Geometry.*—The work consists of recitations from text-books and the graphic solution of problems. After the necessary elementary problems, special attention is given to the practical side of this subject, in its relations to stereotomy, pattern-making, sheet metal work and machine drawing. First half of Freshman year, 1 hour. Second half of Freshman year, 8 hours. *Required of all Engineers.*

C. *Machine Design,* in the Sophomore year, includes recitations from text-books, the copying and tracing of machine drawings,

drawing to scale from models and machine parts, working, detail and assembly drawings, laying out tooth-wheel gearings, and the making of original working drawings from specifications. First half of Sophomore year, 4 hours. *Required of all Engineers.*

D. *Graphic Statics.*—This course includes the study of forces, stresses, couples and moments of inertia, and is introductory to the latter course on Theory of Truss. Recitations from text-books are followed by the application of the principles in the solution of practical problems in roof trusses, involving permanent and temporary loads, snow loads and wind pressures. Second half of Sophomore year, 4 hours. *Required of Civil and Electrical Engineers.*

SHOP WORK.

SUPERINTENDENT COLLAIS.

In the mechanical laboratories it is aimed to give students some knowledge of carpentry, wood-turning, pattern-making, blacksmithing, machinists' bench and vise work, and iron lathe and machine tool work. Practical talks and lectures are given.

A. *Bench Work in Wood.* Students acquire a practical knowledge of the handling of tools and keeping them in order, and of executing models and joints in wood, that develop constructive principles in engineering work. *Required of all Engineers.* Fee, $4.

B. *Pattern-Making.*—Patterns of parts of machinery are made, also cores, valves, valve stems, models in wood turning, pulleys, sheaves, etc. *Required of Electrical Engineers.* Fee, $4.

C. *Forging.*—Students acquire a practical knowledge of the handling and working of iron, mild steel and tool steel, and of the operations of bending, welding, forming, bolt-making, tempering and tool-making. *Required of all Engineers.* Fee, $4.

D. *Work in Iron,* including bench-work, chipping, filing, accurate fitting, scraping surfaces, tool-making and finishing, thread-cutting by hand. *Required of Electrical Engineers.* Fee, $4.

E. *Machine Work.*—

(*a.*) With the lathe: turning, boring, thread-cutting, tapering, eccentric turning, etc.

(*b.*) With the milling machine: surfacing, slotting, dove-tailing, taper work, fluting, gear-cutting, spiral-grooving, etc.

(*c.*) With the shaper: surfacing, cubing, cutting key-ways, etc.

(*d.*) With the drill press: boring and countersinking, tool grinding (including all machine tools).

Required of Electrical Engineers. Fee, $4.

The School of Forestry

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.,
President.

WILLIAM CODMAN STURGIS, Ph. D.,
Dean and Lecturer in Vegetable Pathology.

J. FRED BAKER, M. F.,
Assistant Professor of Forestry and Manager of College Reserve Lands.

FLORIAN CAJORI, Ph. D.,
Professor of Mathematics.

GEORGE J. LYON, C. E.,
Professor of Civil Engineering.

JOHN CUTLER SHEDD, Ph. D.,
Professor of Physics.

WILLIAM STRIEBY, A. M., E. M.,
Professor of Chemistry.

EDWARD C. SCHNEIDER, Ph. D.,
Professor of Biology.

FRANK HERBERT LOUD, Ph. D.,
Professor of Meteorology.

GEORGE IRVING FINLAY, Ph. D.,
Professor of Geology.

LOUIS A. E. AHLERS, A. M.,
Professor of German.

HOWARD MOORE, C. E.,
Assistant Professor of Graphics.

Organization of the School

In the spring of 1905, the increasing demand for instruction in theoretical and applied forestry led to the establishment of the Colorado School of Forestry as a department of Colorado College. The first step in the organization of the School was the acceptance on the part of the College of a gift of thirteen thousand acres of forested land, known as Manitou Park, and situated at a distance of twenty miles from Colorado Springs. The Park has been for some years used as a summer-resort, and visitors have been received at a small hotel and a number of adjacent cottages on the property. These, together with a smaller group of cottages a mile from the hotel, have now become available for the uses of the School of Forestry.

The Park itself affords unusual opportunities. About two-thirds of its area is covered with a good stand of pine and spruce, much of the timber being now mature and ready for cutting. There is an abundance of young growth to replace the timber removed, and the rich land along a stream which waters the valley offers an excellent opportunity for the study of tree-planting, the establishment of nurseries and experiments with various tree-seeds.

Most of the instruction in technical and applied forestry is given at Manitou Park; the instruction preparatory to the study of forestry proper, *e. g.* in Chemistry, Physics, Biology, etc., is given at Colorado College.

Object of the School

The principal aim of the School is to give a thorough training to students who intend adopting forestry as a profession. In this connection it may be said that no profession today offers a better opportunity to a young man of good physique and the desire for an out-door life and plenty of hard work. The expert forester need never fear lack of employment. The Government Forest Service is constantly on the lookout for good men, and the demand for trained foresters on the part of private landowners is steadily increasing.

While the School has in view, first and foremost, the training of professional foresters, it recognizes the fact that there is a large

number of people who have a passing or local interest in forestry, but who lack either the time or the desire for an extensive course. For the benefit of such, the School proposes to offer in the near future special short courses of study. These courses will be especially adapted to forest-rangers, whose duties permit of only brief absences from the Reserves.

Duration and Arrangement of Course

The course, as at present provided for, covers three full years, as outlined in the curriculum given below. Each year is divided into two periods covering, respectively, a Winter and a Summer course of study. The Winter course corresponds to the regular College year of approximately nine months. The Summer course covers approximately the twelve weeks between June fifteenth and September fifteenth.

By this arrangement the students are enabled to devote the full College year at Colorado College to studies related and preparatory to forestry proper, and then to devote the three following months to the study of technical and applied forestry in the laboratory at Manitou Park, as well as in the forests and the lumber camps.

At the close of the three-years course, the student who has completed it satisfactorily should be fitted to fill a position either in the Government Forest Service or in private employ as an expert forester.

The concentration of work in forestry proper during a Summer term of three months duration also presents the advantage of giving an opportunity to persons, properly qualified, who may be pursuing studies elsewhere during the academic year, to take the Forestry course at Manitou Park while still connected with their respective institutions.

Since the ability to finish the full course in three years largely depends upon the degree of preparation, especially in Science, shown by applicants for admission to the School, preference is given to those who have had some previous training in the Natural Sciences.

Requirements for Admission

Before registering, each candidate must present to the Dean a certificate of moral character signed by some responsible person in the community in which he has made his home.

No intellectual test is applied to candidates for admission, but every candidate must satisfy the Dean of his ability to pursue the studies required in the course. In general, a candidate should have at least a High School training or its equivalent.

Fees and Expenses

The fee for tuition is fifty dollars for each year of the course. This does not include the small special fee charged in certain of the prescribed laboratory courses, nor does it include the railway fares to and from Manitou Park. The tuition fee for students taking only the Summer course will be arranged on application to the Dean.

Course of Study

COURSES GIVEN IN COLORADO COLLEGE.

First Half of the First Year.

Mathematics—A. *Algebra.* Series; The Binomial Theorem; Logarithms; Undetermined Coefficients; Theory of Equations. 4 hours.

Graphics—A. *Elements of Drawing.*—This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right line and the bow-pen, conventional representations, mathematical curves, cycloidal and other motion curves, isometric, oblique and orthographic projections, working drawings, tracings, the form and proportions of standard letters, both free-hand and ruled, methods of spacing and laying out titles.—Mr. Moore.

Students are expected to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

Biology—A. *General Biology.*—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution. First half-year: Laboratory study of typical green flowering plants, with special reference to the structure and function of their various organs; a comparative study of cryptogams, beginning with the simplest forms. Second half-year: Careful dissection of the frog and microscopic study of some of the more important organs; some of the simpler forms of animals. Recitations, lectures, and laboratory work. 6 hours (counts 3 hours). Laboratory fee, $2.50.—Professor Schneider.

German—A. *Elementary Course.*—Joynes-Meissner's *Grammar.* Andersen, *Maerchen;* Storm, *Immensee;* Hauff, *Das kalte*

Herz, Die Karavane; Eichendorff, *Aus dem Leben eines Taugenichts.* 3 hours.—Professor Ahlers.

Forestry—C. Professor Baker. (See p. 102.)

Second Half of the First Year.

Graphics—B. *Descriptive Geometry.*—The work consists of recitations from text-books and the graphic solution of problems. After the necessary elementary problems, special attention is given to the practical side of this subject, in its relations to stereotomy, pattern-making, sheet metal work and machine drawing.—Mr. Moore.

Students are expected to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

Mathematics—A.

Biology—A or J* or K.*

German—A.

First Half of the Second Year.

Chemistry—B. *Advanced Chemistry.*—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science, and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. Three hours' recitation or lectures, and four hours of laboratory work (counts three hours). Laboratory fee, $7.00.—Professor Strieby.

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*Courses J and K will be offered in 1907-1908 and alternate years.

PHYSICS—B. *General Physics.* Credit 4 hours.—PROFESSOR SHEDD.

(1) Three lectures and one recitation per week. In these lectures the mathematical development of the subject will be emphasized. A knowledge of plane trigonometry is prerequisite to the course.

(2) Two periods of two hours each of laboratory work.
First half-year: Mechanics, Heat, Sound.
Second half-year: Light, Magnetism, Electricity.

MATHEMATICS—C. *Calculus, Differential and Integral.*—First half-year, three hours. Second half-year, four hours.

BIOLOGY—J. **Plant Physiology.*—Prerequisites, Biology A and Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon the composition and nutrition of plants, and the vegetable enzymes. Five hours (counts two hours). Laboratory fee, $3.00.—PROFESSOR SCHNEIDER.

OR

GEOLOGY—A. *General Geology.*—Prerequisite, Elementary Chemistry. The course comprises Dynamical, Structural and Historical Geology. Lectures, laboratory work Tuesday and Thursday afternoons, and field excursions Saturday mornings. Texts: Chamberlin and Salisbury's *Geology,* Scott's *Introduction to Geology.* Three hours.—PROFESSOR FINLAY.

FORESTRY—C. PROFESSOR BAKER. (See p. 102.)

SECOND HALF OF THE SECOND YEAR.

CIVIL ENGINEERING—A. *Theory and Practice of Surveying.*—Construction, use and adjustment of instruments; pacing survey; contouring and leveling by hand-level; theory of stadia measurements; azimuth traverse; balancing survey. Two recitations and two afternoons' field or office work. Fee, $4.00.—PROFESSOR BAKER.

BIOLOGY—K* or GEOLOGY—A.

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*Courses J and K will be offered in 1907-1908 and alternate years.

MATHEMATICS—C.

CHEMISTRY—B.

PHYSICS—B.

FIRST HALF OF THE THIRD YEAR.

FORESTRY A. *Soil Physics.*—A study of the agencies at work in soil formation and destruction. Special attention is given to the preservation of forest soil. Lectures and laboratory work. Two hours. Fee, $3.00.—PROFESSOR BAKER.

GEOLOGY—A or BIOLOGY—J.*

ENGINEERING—AA. *Advanced Surveying.*—Topographic, hydrographic, city and mining surveying. Instruments and field methods used in geodetic surveying. Simple, compound and reversed railroad curves; turnouts and switches; theory of earthwork computations. Two recitations and six hours of field or office work. Fee, $4.00.—PROFESSOR BAKER.

GERMAN—N. *Scientific German.*—Two hours.—PROFESSOR AHLERS.

Open only to students who have taken Elementary German.

FORESTRY—B. *Diseases of Trees.*—A course of lectures and laboratory work on injuries to trees caused by parasitic fungi. Also the causes and effects of wounds and the treatment of such injuries. The course includes a consideration of normal and pathological vegetable physiology.—DR. STURGIS.

SECOND HALF OF THE THIRD YEAR.

ENGINEERING—B. *Resistance of Materials.*—Laws of elasticity in homogeneous materials; coefficients of elasticity; relations between stresses and strains; common theory of torsion and flexure; elastic limits, working stresses and ultimate resistances of wrought iron, cast iron, steel, alloys, timber, building stones, con-

*See note under Biology J, p. 100.

crete and masonry; simple and continuous beams; design and construction of iron, steel, and timber columns and beams, including design of plate girders; shafts; cables, specifications. Three hours' lectures and recitations, with work in the cement and testing laboratory. Fee, $4.00.—PROFESSOR LYON.

GEOLOGY—A or BIOLOGY—K.*

GERMAN—N.

ENGINEERING—L. *Roads, Pavements and Parks.*—Surveys and locations; drainage and grade; foundations; selection and treatment of materials; maintenance of roads and pavements; design, construction and maintenance of parks and parkways. Two hours' credit. Lectures, recitations and assigned readings.—PROFESSOR LYON.

METEOROLOGY—D. *Elementary Meteorology.*—Prerequisite, Elementary Physics. Text: Davis' *Elementary Meteorology.* Three hours.—PROFESSOR LOUD.

COURSES GIVEN AT MANITOU PARK.

FIRST YEAR.

FORESTRY—C. 1. *Principles of Forestry.*—This is a lecture course which presents tersely the idea of Forestry as a whole, and aims to give the student an understanding of the demands of the profession.

2. *Forest Influences.*—The relation of forests to climate, soil and topography are discussed in a series of lectures.—PROFESSOR BAKER.

FORESTRY—D. *Forest Botany.*—The object of this course is to enable the student to identify trees and shrubs under field conditions, both winter and summer. Special attention is given to the arborescent flora of the Rocky Mountain region. A comprehensive collection of native species is required to be handed to the instructor in charge at the close of the work.—PROFESSOR BAKER.

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*See note under Biology J, p. 100.

FORESTRY—E. *Forest Practice.*—The object of this course is to illustrate by practical field work the forestry operations during the different seasons throughout the school year.—PROFESSOR BAKER.

SECOND YEAR.

FORESTRY—F. *Silviculture.*—This course takes up (*a*) the establishment and care of seed-beds and the forest nursery; (*b*) the transplanting of seedlings and the natural establishment and care of wood-lands; (*c*) the characteristics, habits and distribution of our more important forest trees, as well as the distribution and character of the forests in the United States as a whole. Fee, $5.—PROFESSOR BAKER.

FORESTRY—G. *Forest Mensuration.*—Methods are discussed for the calculation of the volume of felled and standing trees, the use and construction of log rules, and the determinations of the increments of diameter, height and volume. Special attention is given to the methods of estimating standing timber on large forested areas. The instruction in this course consists partly of lectures and partly of practical field work.—PROFESSOR BAKER.

FORESTRY—E. (See under First Year).

FORESTRY—H. *Forest Protection and Management.*—The best methods for the economic protection and management of woodlands are taken up for discussion. Studies are made of the European methods and their conditions as compared with our own.—PROFESSOR BAKER.

THIRD YEAR.

FORESTRY—D. *Wood Technology.*—The study and identification of the more important of the commercial woods of the United States with a discussion of the source and character of the forest products. Lectures and laboratory work.—PROFESSOR BAKER.

FORESTRY—E. (See under First Year).

FORESTRY—F. *Forest Accounts.*—This course is designed to give the student a working knowledge of the best methods of

booking the business transactions which occur in the management of a forest.—PROFESSOR BAKER.

FORESTRY—J. *Forest Entomology and Zoology.*—This is a general study of the animal life of the forest. Special attention is given to insects causing injuries to tree growth. Their habits and the best methods of combating them are studied. A collection of representative species of insects properly named and labeled with field notes in detail is required to be handed to the instructor in charge upon completion of the work.—PROFESSOR BAKER.

School of Music

FACULTY.

EDWARD DANFORTH HALE, A. M. 1123 N. Weber St.

Dean of the School of Music and Professor of the Theory and Literature of Music, and the Pianoforte.

A. B. (Williams College), '80; A. M. (*ibid.*), '83; Professor at the New England Conservatory, '85-'04; Colorado College, '05.

MRS. ROBERT BRISCOE. 801 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95; Colorado College, '00.

MRS. FREDERICK A. FAUST. 116 E. Dale St.

Instructor in Pianoforte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

MRS. GEORGE MAJORS PERRY. 120 E. San Rafael St.

Instructor in Voice Culture.

Oberlin Conservatory, '98-'02; Pupil of Mrs. Seabury Ford, William Saal, Felix Hughes, Herbert Witherspoon; Colorado College, '05.

ROBERT W. STEVENS.*

Instructor in Pianoforte, Organ and Orchestration.

Pupil of Zeisler, Pratt, Sherwood, Godowski, Theodore Thomas; Colorado College, '05.

COURSE OF STUDY.

A. *General Musical Culture.*—A reciprocal study of composition and the pianoforte. Original work in composition from the

*On leave of absence, 1906-07.

outset combined with thorough experimental reading of Goetschius, *Material of Musical Composition and Applied Counterpoint;* Gow, *Structure of Music;* Chadwick, *Harmony;* Foote and Spalding, *Modern Harmony;* Cutter, *Harmonic Analysis;* Spalding, *Tonal Counterpoint;* Cady, *Music-Education.* Other authorities consulted. Material of the pianoforte study minutely analyzed, structurally and technically. Further contact with the pianoforte study obtained through the weekly conferences, which are required. Pianoforte study devoted to the masterpieces of musical literature to the end of musical scholarship. The technical work carried on by eclectic, scientific methods, as in the special pursuit of virtuosity. Two or more hours. Tuition, $50 each half-year.

Upon the completion of Course A and of the prescribed college studies as outlined in the prospectus of the School of Music, the student will receive the degree of Bachelor of Music.

B. *Pianoforte, Organ, Voice, Violin, or Violoncello.*—Lessons daily. Tuition, $35 each half-year.

C. *Composition* (including *Harmony and Counterpoint or Orchestration.*) One or more hours weekly. Tuition, $15 each half-year.

The weekly conferences are devoted to the discussion of all topics vitally related to music study, to the first experience of pupils in playing in public—a kind of artist-apprenticeship—and to the structural and technical analysis of the works of the masters. This and other phases of school work, recital-lectures, recitals by faculty and pupils, solfeggio and normal work, are free to all students of the School and College.

Some practical acquaintance with physiological psychology is indispensable to the intelligent prosecution of music study. Students in Course A are expected, and all others are urged, to join the College classes in psychology (see pp. 29-30).

DIPLOMA.

The diploma of the School, given only for satisfactory attainment of musicianship, is a guarantee both of thorough ability as a musician and of the equipment of a competent teacher.

The Cutler Academy

Cutler Academy, a preparatory school for boys and girls, is named after the late Henry Cutler, of Massachusetts, a generous and steadfast friend of Colorado College. It is under the control of the Board of Trustees of the College. It provides a thorough preparation for any college in the United States. While the preparatory training is the principal aim, the plan of study is so arranged as to meet the requirements of students who do not propose entering upon college work. Classical and Scientific courses are given, in each of which the work covers four years. Many of the advantages enjoyed by the students of the College are shared by the pupils of the Academy.

The Academy receives girls as day students only, and therefore is open only to those girls whose homes are in Colorado Springs.

Full information as to admission, courses, etc., is given in the Cutler Academy Bulletin, which will be sent on application.

Correspondence concerning Cutler Academy should be addressed to the Principal, M. C. Gile.

General Information

LOCATION.

Colorado College is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Founded in 1871, under the direction of men of shrewd foresight and broad views, it has maintained from the beginning high standards of morality and culture. Saloons and the attendant destructive influences are absent. Radiating railroad systems and neighboring gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers, but the invalids are so far outnumbered that the place has none of the depressing influence so often observed at noted health resorts. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous canons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the opportunity for outdoor exercise afforded by the great number of fine days and the dryness and rarity of the air, helpful in cases of malarial disease, asthma, and incipient phthisis. Students unable to work in other climates may here continue their studies, while at the same time making a permanent gain in health.

COLLEGE BUILDINGS.

The buildings of the College are situated on a tract of about 50 acres, in the heart of the best residence portion of the city.

All except the Gymnasium and the Mechanical Laboratory are

of stone. Heat and electric light are furnished to all from a central plant.

Palmer Hall, completed in the fall of 1903, at a cost of $287,000, contains the offices of administration and laboratories for scientific work in all departments. It is 287 feet long with a depth from north to south of 95 feet. Besides a sub-basement, there are three stories, a basement and a first and second floor. The style of architecture is that which has been chosen for the entire system of buildings eventually to occupy the College reservation. The structure is fireproof. In the basement are laboratories for Chemistry, Physics and Psycho-physics, and a large demonstration room. On the first floor are the offices of administration, general lecture rooms, and other laboratories for Chemistry and Physics. The second floor contains the laboratories and lecture rooms for Biology, Geology and Mineralogy, and a large, well-lighted Museum for the natural science collections of the College. In the hallway is a life-size portrait of General William J. Palmer, executed by Mr. Herman G. Herkomer. The building was equipped at a cost of $50,000.

The Perkins Fine Arts Hall, named for one of the principal donors, the late Willard B. Perkins, of Colorado Springs, was completed in 1900. It is a two-story stone building, erected at a cost of $30,000. The lower story is a large auditorium, seating 600, in which the chapel exercises are held and concerts and lectures are given. This room contains a valuable pipe organ, given by Miss Elizabeth Cheney, of Boston, Mass., in memory of her brother, Charles P. Cheney. In the hallway stands a bronze statue of the Flying Mercury. The upper story contains the lecture and practice rooms of the School of Music, and the art gallery, in which are hung a few choice paintings, which, it is hoped, are the nucleus of a large collection—Mr. Leslie J. Skelton's "Meadow-land, Montigny, France," a picture by M. Iwill, two paintings by the late Harvey Young, "Crystal Lake, California," and "La Sal Mountains," and "Mlle J." by Mr. Howard M. Hartshorn, which was exhibited at the Paris *Salon* of 1902, and recently presented to the College by Mr. Hartshorn. On the walls of the upper hall is a valuable collection of Japanese prints, presented by Mr. James F. Burns.

The Library, given in 1894 by the late N. P. Coburn, of New-

ton, Mass., and erected at a cost of $50,000, is of great architectural beauty and admirably adapted to its purpose. It is of the "Peach Blow" sandstone of Colorado, and its roof is of red tile with copper mountings. A full-sized cast of the "Winged Victory" of Samothrace stands at one end of the main hall. In recesses are marble busts of Antinous and Dante, and casts of the Hermes of Praxiteles and of Mercie's David. Mr. A. L. Dickerman's collection of rare and valuable Indian curiosities adds to the interest of the room.

The Astronomical Observatory is the gift of Henry R. Wolcott, Esq., of Denver, and was completed in 1894. Besides the dome room it contains a lecture room, a transit room, and a photographic dark room.

The Mechanical Laboratory. Two buildings contain the dynamo room and the mechanical laboratories for carpentry, forging, and machine work.

The Gymnasium, built by the students of the College in 1891, contains a useful assortment of apparatus. See "Physical Training," p. 122.

The President's Residence, at the northern boundary of the campus, was purchased by the Trustees in 1888, and was remodeled in 1903.

Cutler Hall (formerly Palmer Hall), the oldest building on the campus, was first occupied in 1880. It contains recitation rooms, and chemical, physical and biological laboratories. It is now devoted to the use of Cutler Academy.

COLLEGE RESIDENCES.

Hagerman Hall is a substantial stone building, built in 1889, and used as a home for young men. Besides the students' rooms, which are well lighted and attractive, it contains a dining room accommodating one hundred and fifty persons, now used by a young men's boarding club, and the Y. M. C. A. reading room. On the roof are some of the Meteorological Station instruments, connected with the electric registering apparatus in the Observatory.

Montgomery Hall was erected and furnished in 1891 by the Woman's Educational Society, and presented free of debt to the College. It provides a comfortable home for young women.

Ticknor Hall, the generous and beautiful gift of Miss Elizabeth Cheney, was opened as a home for the young women of the College in January, 1898. Besides students' rooms, it contains a dining-room, drawing-rooms, and guest-rooms, a study-room for the use of all young women of the College, and an infirmary capable of complete isolation. The infirmary is open to all young women living on the campus, and is in charge of a trained nurse, whose services, whether in the infirmary or in the students' rooms, are paid for by an annual fee of $5.00 from each young woman. This fee is due in September.

McGregor Hall, a commodious and convenient building, was opened in September, 1903, for use as a third residence for young women. It contains a fully equipped gymnasium.

No young woman will be received into the halls who is not of full college rank, who is less than sixteen years of age, and who is not taking at least fifteen hours' work or its equivalent. Young women from out of town are required to live on the campus. In the case of an overflow, suitable rooms in the vicinity will be arranged for by the Dean of Women.

LIBRARY.

MANLY D. ORMES, LIBRARIAN.

The Library building has been elsewhere described (see p. 109). In it are about 40,000 volumes and as many pamphlets. The leading literary and scientific journals are received, as are also the United States Government publications and those of the State of Colorado. Of United States documents the library now has about 8,000 volumes, including the records of Congress complete from 1847, and many valuable records for the period 1774-1847. These documents are arranged on the plan adopted in the library of the Superintendent of the United States Documents at Washington.

The Medical Alcove was created in 1894, when the late Dr. B. F. D. Adams, of Colorado Springs, presented to the College his extensive medical library. The El Paso Medical Society contributes the transactions of Medical Societies and standard works purchased by the Society, in number about a hundred volumes a year. In 1896 the collection was enlarged by the gift of 250 volumes and 300 pamphlets from the late Dr. E. C. Kimball, of Colorado Springs, and again in 1904 by the gift of 205 volumes from the library of Dr. James A. Hart, also of Colorado Springs.

The Coburn Library Book Club, organized in 1897, provides its members with the best new books, which are given to the Library after two years. The fee is $5 a year or $3 for six months. Members enjoy the full privileges of the Library. The Club has purchased about 2,500 books, of which nearly 2,300 have been given to the general Library.

The Wednesday Art Club and the local Chapter of The Daughters of the American Revolution have also started collections of books on their special topics.

A reading room is provided with the current literary and scientific magazines, as well as a number of leading newspapers.

In 1904 the Engineering Department of the Library was installed in the basement in a room prepared for the use of the Pike's Peak Polytechnic Society. In addition to the 1,500 volumes belonging to the College, it contains several valuable private libraries loaned by members of the society, to which students of the Engineering Department have access.

In room 44 of Palmer Hall are about 300 volumes which form the beginning of a department library for Greek and Latin. These books have been given to the Classical Department by Mrs. M. C. Gile.

LABORATORIES AND APPARATUS.

PHYSICS.

The Sophomore Laboratory contains, among other apparatus, a large standard clock equipped with a special magnetic contact-maker, a standard H. J. Green barometer presented by General

William J. Palmer, a large Gærtner cathetometer, ballistic pendulum, Borda pendulum, Kater pendulum, chronograph, apparatus for determining moduli of elasticity, an air thermometer, apparatus for determining vapor density and apparatus for determining viscosity of oils. A number of pieces of apparatus have been made by Mr. E. J. Hoff, of Colorado Springs, from original designs furnished by the department. The Photometer room is furnished with a three-meter photometer track, Lummer-Brodhun screen, and revolving apparatus for the photometric measurement of light sources.

The Electrical Laboratory is equipped for the Junior and Senior experiments, as well as for the Junior work in the Electrical Engineering course. Some of the latest types of electrical apparatus are included in its equipment. Mention may be made of the following: a standard potentiometer, a Carey-Foster bridge, and a Hopkinson Permeameter, from the Willyoung and Gibson Company; a Bose Magnetic Balance, an Induction Bridge, and a Beggerow Electrometer, from the Siemens and Halske Company; a sensitive moving coil galvanometer, a standard of self-induction and a permeameter testing set complete, from the Hartmann and Braun Company; a students' magnetometer and a resistance thermometer, from the Cambridge (England) Scientific Company. Of the above items the last eight were secured from the exhibits at the St. Louis Exposition.

There are smaller laboratories for Junior and Senior experiments in Optics and Heat, and a photographic developing room.

The Lecture Room is furnished with projection apparatus for transparent slides and for opaque objects such as photographs, mechanical drawings and models.

The Apparatus Room contains the apparatus for demonstration work and that not in immediate use. Mention may be made of a large static machine presented by the Alumni Association of Colorado College, a Tesla X-Ray Coil presented by Dr. Gerald B. Webb, of Colorado Springs, a large Michelson Interferometer and a Fluess Air-pump.

CHEMISTRY.

The Chemical Laboratories include: (1) The General Lab-

oratory; (2) the Qualitative Laboratory; (3) the Quantitative and Electro-chemical Laboratory; (4) the Organic Laboratory; (5) the Assay Laboratory. The best features of modern arrangement and construction have been embodied. The lighting and ventilation have received especial care. The hoods are generously distributed in every working room, and each hood is connected with a large separate flue. The ceilings are high, the light excellent, the desk and working space for each student is abundant and the drainage through iron covered floor drains is of the most approved modern type. The desks are provided with combination locks and fitted with very full sets of reagents and all facilities for the prosecution of the work in hand. Adjacent to the laboratories are the preparation rooms, which provide for the ready distribution of supplies. These smaller rooms, which are used for particular branches of chemical study, are supplied with the appropriate means of work, fine balances, spectroscope, the best Schmidt and Hænsch polariscope, photographic apparatus, combustion furnaces and a large assortment of metal and glass apparatus for general and analytical processes of investigation.

BIOLOGY.

The Biological Laboratories are eight rooms on the second floor of Palmer Hall. In these each student is assigned a desk, and in courses requiring microscopic observation is furnished with a microscope for which he is held responsible. There is an abundant supply of all kinds of glassware necessary for the various courses, also micrometer-eye-pieces, cameras, dissecting microscopes, paraffine bath, microtomes (Reichert's and Minot's), life-boxes and charts. For the courses in Zoology, Comparative Anatomy, etc., a number of mounted and disarticulated skeletons and anatomical models are provided. A large amount of the museum material is also available for illustration in these courses. The physiological laboratory is supplied with such Harvard apparatus as the capillary electrometer, rheochords, inductoriums, kymographs, moist chambers, muscle warmer, heavy muscle-lever, ergograph, pneumograph, work adder, manometers, interrupters, circulation scheme, respiration scheme, and a number of smaller pieces. In addition, there are on hand such pieces as Kronecher's mercury cup metronome, Ludwig's arm support and sphygmograph, Marey's cardiograph, stethoscope, Er-

langer's and Cook's sphygmomanometers for blood-pressure determinations, Thoma-Zeiss hæmacytometers for the enumeration of the corpuscles of the blood, and Fleischl's hæmometer and Gower's hæmoglobinometer for the estimation of the hæmoglobin of the blood, Lombard's modification of Mosso's ergograph, a spirometer, and belt spirograph. The equipment for Bacteriology includes an incubator, Arnold steam sterilizer, autoclav, hot-air sterilizer, Becker balance, Trœmner media scale, centrifuge, animal holders, culture jars, water sampling apparatus, inoculating water baths, double boilers, hot-water funnels, counting apparatus (Esmarch's and Wolffhuegel's) and other appliances essential to the work. For botanical courses clinostats, auxinometers and a variety of smaller apparatus are provided.

The Herbarium occupies a room in the Biological Department. The nucleus consists of a Colorado herbarium purchased from Marcus E. Jones. The larger part of the present collection is the Edward Tatnall herbarium, which was presented to the College by Miss M. H. Tatnall, of Elmira, N. Y. This collection, of about 22,000 species and varieties, includes representatives of all the great plant groups. Of these there are some 900 Algæ, 1,700 Lichens, 2,000 Bryophytes, 1,050 Pteridophytes, and 16,350 Angiosperms. These specimens, which are carefully and fully labeled, were collected in 23 different states, Canada, Sweden and England, by 65 collectors. A catalogue makes the herbarium especially valuable.

GEOLOGY.

Five rooms are occupied by the Department of Geology: a general lecture room and laboratory, mineralogical and paleontological laboratories, a departmental library and a photographic dark room. The general laboratory is provided with five large models and relief maps for the illustration of river work, glaciation, and vulcanism, together with a complete set of the geological maps of the United States Geological Survey and nearly 500 topographic maps. Suites of rock specimens are provided, covering all the main types of the igneous, sedimentary and metamorphic rocks, as well as representative specimens from important mining districts in Colorado. A carefully prepared collection of thin sections of rocks is

available for microscopic study, covering the varieties of the igneous rocks and illustrating their mineralogy. One Siebert petrographic microscope of the 1904 model is provided for every two students.

In the mineralogical laboratory a general collection, numbering several specimens for each of the 175 minerals taught in the introductory course, is set out in open cases for the illustration of the crystal forms and the variations in the massive kinds. Each student is given a working collection covering the same minerals. Crystallography is taught by means of 150 models of crystals in wood and by the aid of a small collection of transparent models. The material for the practice determinations required of every student embraces 3,000 specimens.

For the work in paleontology the collections of fossils in the College museum are employed. They are representative of a large number of the genera in the several classes of invertebrates.

The departmental library contains complete sets of the publications of the United States Geological Survey, Annual Reports, Monographs, Bulletins and Professional Papers with about 150 of the annual volumes issued by the state surveys, and general works of reference.

OBSERVATORY.

The Observatory has a telescope of four-inch aperture, presented by Mr. Henry R. Wolcott, of Denver, a transit and a sidereal clock, both given by the late Charles S. Blackman, of Montreal, Canada, and several of the instruments of the College Meteorological Station. The largest of these instruments, the quadruple register, donated by General Wm. J. Palmer, records minute by minute the direction and velocity of the wind and the sunshine and rainfall, by means of electric connection with instruments on the Observatory and on Hagerman Hall. In shelters are instruments for measuring and recording temperature and humidity. A Draper barograph, given by the late Dr. S. E. Solly, affords a continuous record of the atmospheric pressure. The Observatory possesses bound records of observations and instrumental registers of previous years, together with the beginnings of the meteorological library, valuable accessions to which have lately been received from General Palmer.

Special information has been furnished on request to the city engineer and to several railway companies, while tabulated state-

ments of the current weather are supplied regularly to the local newspapers, to the city health officer, and, through the Chamber of Commerce, to various applicants at home and abroad, who desire them for publication. Full statistical records are issued annually, as numbers of The Colorado College Publication.

The Observatory is regularly open to visitors on Thursday evenings.

THE WESTERN ASSOCIATION FOR STELLAR PHOTOGRAPHY.

Colorado College, in common with other educational institutions of the state, is interested in the success of the Western Association for Stellar Photography, an organization which was incorporated October 24, 1904, for the promotion of astronomical science by the use of photographic methods. The officers are: President, Edward C. Pickering, Director of Harvard College Observatory; Vice-President, Herbert A. Howe, Director of the Chamberlin Observatory, Denver; Secretary and Treasurer, Frank H. Loud, Colorado College.

The Association owns an equatorially mounted camera of small aperture, but of excellent definition and accurate mounting, a duplicate of instruments in use at Cambridge, Mass., and Arequipa, Peru. This is the first fixed plant of the kind in Colorado. It is in operation on Nob Hill, about two miles east of the College grounds, and is yielding good results. Of these some use has already been made for purposes of instruction; particularly of Mr. W. N. Birchby's solar photographs, taken during the recent period of sunspot maximum, and showing numerous spots and groups.

It is found that the transparent air of Colorado is eminently suitable for this species of investigation, and a course including practical work with this instrument is offered to students of the College.

MUSEUM.

WILLIAM LUTLEY SCLATER, DIRECTOR.

The museum is on the second floor of Palmer Hall. Glass showcases extend on all sides of the room. The central part is

taken up with the larger specimens. The megatherium and a restoration of the mammoth occupy the west half and a mounted skeleton of a whale occupies the eastern portion. Grouped around them are the large natural history specimens, casts of noted fossils, and at intervals are showcases for small specimens.

The foundation of the Museum was laid by the gifts of Professor J. H. Kerr, Mrs. Rice, the Rev. E. N. Bartlett, Dr. E. P. Tenney and Mr. George Fowler.

Paleobotany is represented by two cases of Carboniferous, Cretaceous, and Oligocene plant remains classified by Mr. Baker.

Paleontological Department.—Several cases are given up to the display of the invertebrate fossils, which are zoologically arranged. The collection contains typical and rare forms of foraminifera, corals, crinoids, brachiopods, mollusca and arthropoda. The mollusca and echinoderms collected by Professor Cragin are for the most part from the lower Cretaceous. The mollusca from the Atlantic slope, presented by Professor Wm. B. Clark, of Johns Hopkins University, are chiefly Tertiary. Besides an excellent geological record, the collection contains a series of casts of noted specimens.

The foundation for the collection in vertebrate paleontology was laid by the purchase for the College of the large paleontological cabinet of Professor Cragin by General Wm. J. Palmer and the Colorado Springs Company. This collection consists of some 8,000 specimens from Colorado, Kansas, Indian Territory, Texas, and other states, and includes remains of Pliocene horses, llamas, Miocene rhinoceroses and mastodons, Cretaceous saurians, and Tertiary fishes. It is of importance not only as supplying a large part of the geological record not otherwise represented in the Museum, but also as containing the types of many new species and some new genera of fossils. Among these type fossils the most important is the large plesiosaurian reptile *Trinacromerum,* the type of a new genus and species described from the Cretaceous of Kansas in 1888. Another valuable item of the collection is the extensive series of casts of fossil vertebrates given by the late W. S. Stratton. These casts include such forms as the Ichthyosaurus, Archæopteryx, Glyptodon, Dinotherium head, Elephas head, Mastodon head and tusks, Magatherium and a restoration of Colossochelys, Plesiosaurus, Mammoth and other forms.

Natural History.—Collections in invertebrate zoology occupy several showcases and include cœlenterata, echinodermata, mollusca, and common and rare forms of foraminifera.

Vertebrates are well represented by the large natural history collection received through the generosity of W. S. Stratton. It contains 29 species of fishes, among which are the blue-shark, a few ganoids, and several curious tropical forms. Among the 23 species of reptiles, the most important are the Indian crocodile, python, iguana and the gila monster. The collection includes 442 species of birds, including such interesting forms as the ostrich, cassowary, Australian crane, apteryx and Argus pheasant. The ornithology of all parts of the world is represented by the more striking forms. The mammals number 170 and include a group of mounted orang-utans, a group of all known genera of marsupials, the Indian elephant, rhinoceros, nylghau, polar bear, and a complete mounted skeleton of a large whale.

Mineralogy.—The collection in mineralogy occupies the north side of the room and includes 1,450 specimens of minerals, common, commercial and rare.

Ethnology is represented by a series of casts of skulls and brains of different peoples. The series also contains 125 masks of South Sea Islanders and 25 framed pictures of different races.

Anthropology.—The anthropological department contains a large amount of pottery from Missouri, New Mexico and Peru; the Taos pueblo, Pueblo Bonito, and DeChelly ruins are reproduced in miniature. The Bixby-Lang and Deane collections from the Cliff-dwellers were received through General Palmer.

The Bixby-Lang collection was made in Southeastern Utah and Northern Arizona during the years 1897-98. The collection includes almost 500 specimens of pottery, implements, skulls and mummies. The specimens of pottery are exceptionally well preserved. The Deane collection was made in Western New Mexico and includes over 800 specimens of pottery, implements, skulls and idols.

There is also a collection of Egyptian antiquities received from the Egyptian Exploration Society, of which Colorado College is a member.

The Museum contains over 16,000 exhibited specimens and about 5,000 more specimens are stored. The work of making a card catalogue is now under way.

An effort is being made to develop the local collections, especially of Colorado animals.

RELIGIOUS LIFE.

The College is distinctly Christian, and recognizes Christian character as the highest attainment. It is unsectarian in its management. Inquiry is made of the students at entrance, as to their denominational affiliations, and what churches in the city they desire to attend; lists are sent to the pastors of these churches, who seek out the students and bring about them the influence of church homes. Morning prayer is held in the chapel daily, attendance upon which is required of all students. Occasionally the service is shortened for the President's addresses, in which he discusses questions bearing directly on student life.

Occasional Sunday Vesper services are held in the chapel, conducted by clergymen of various denominations. The Day of Prayer for Colleges is marked by appropriate observance. Weekly prayer meetings on Sunday afternoons and Friday evenings are in charge of the student organizations.

The Young Men's and the Young Women's Christian Associations are represented by strong branches, under the auspices of which are conducted mission work at home and abroad, and classes for Bible study. These Associations send delegates to all the state and national conferences. The Young Men's Christian Association is under the leadership of a paid student secretary, Mr. Harry E. Ewing.

The Student Volunteer movement is also represented. Of the former members of the band, some are continuing in other institutions their preparation for the foreign field, and others are already actively engaged in missionary work.

At the beginning of the College year members of the Associations meet all trains and welcome new students.

STUDENT PUBLICATIONS.

The Tiger, a weekly newspaper, is issued by an editorial board composed of College students. An annual, *The Pike's Peak Nugget,* is published in May by the Junior class. A *Handbook* of information is issued at the beginning of the College year by the Y. M. C. A.

LITERARY SOCIETIES.

The Apollonian Club and the Pearsons Literary Society, composed of young men, and the Minerva Society, the Contemporary Club and the Hypatia Society, composed of young women, hold weekly meetings for debate and other literary work.

ORATORICAL AND DEBATING CONTESTS.

The Oratorical and Debating Association, of which all students are members, has charge of contests in public speaking. The Association is supported by a voluntary assessment upon the student body. Four contests are held each year as follows:

The Freshman-Sophomore prize contest in declamation is held early in December. Four speakers from each class compete. The first prize is $15; the second, $10.

The State Oratorical Contest between Colorado College, Denver University, the University of Colorado and the Colorado Agricultural College, is held on the third Friday in February. The preliminary contest at Colorado College is held a month before that time. A first prize of $25 and a second of $15 are awarded in the final contest.

An Intercollegiate Debate is held in April.

The Memorial Day Contest in Oratory between the men's literary societies is held on the 30th day of May. Books valued at $10 and $8 are the prizes offered. The first prize is given by the Colorado Springs Post of the Grand Army of the Republic, the second by the Zebulon Pike Chapter of the Daughters of the American Revolution.

Besides these events there is an annual public debate between representatives of the Apollonian and Pearsons Societies.

PHYSICAL TRAINING.

The open climate of Colorado Springs makes outdoor sports possible and attractive throughout the year. Tennis is played all winter, track and baseball practice may be begun as soon as the football season is over. The young men and the young women have separate gymnasia, furnished with shower baths, lockers, etc.

Football, baseball, basketball and track athletics for the men are managed by the Colorado College Athletic Association. The interests of the Association are controlled by a Board, consisting of Professor M. C. Gile, from the faculty, Messrs. W. R. Armstrong and Hildreth Frost from the alumni, and Messrs. A. H. Fisher, Wm. Lennox and N. C. Morris from the students. Mr. W. R. Armstrong is President of the Board, Professor Howard Moore is Treasurer, and Mr. McClintock is Secretary.

In 1898 the Athletic Association laid out, at large expense, the Washburn Athletic Field, named in honor of the Rev. Philip Washburn. For this purpose, the natural amphitheatre in the rear of the college buildings, facing the mountains, was used. About five acres of ground were leveled and a grand stand, seating 600, was erected. In 1900 a grand stand, seating 800, was given by Mr. James F. Burns. In 1904 a gift of $1,000 from Mr. Charles Washburn, in memory of his brother, the Rev. Philip Washburn, together with a gift from General Palmer, made many further improvements possible. The field has been enlarged to contain two football fields, two baseball diamonds, a quarter-mile cinder track, and a two hundred and twenty yard straight-away track. For adaptation to its purposes, there is no more complete and satisfactory college athletic field in the West.

Physical Training for the young women is in charge of Miss Mary Helen Woodsmall. All are required to take this work. Special exercises are planned for those whose health does not permit them to enter the general classes. Dark blue suits with short skirts and gymnasium slippers are required. Opportunity is given for out-of-door work. A new hockey field and a special athletic field have been made, providing grounds for basketball, tetherball, running, etc.

PHI BETA KAPPA.

A charter of the Phi Beta Kappa Society was granted to Colorado College in 1904. The object of the Society is the promotion of scholarship and friendship among students and graduates of American colleges. The members of the Society are elected primarily from the best scholars of the graduating classes of the College; secondly from the graduates of the College whose post-graduate work entitles them to such honor; and lastly from any persons distinguished in letters, science, or education. In addition to scholarship, good moral character is required as a qualification of membership.

One-seventh of the regular members of each graduating class in the collegiate department of Colorado College are eligible to election to the Phi Beta Kappa Society at the end of the first half of the Senior year. No student, however, is eligible who does not take his Junior and Senior years in Colorado College, or who has not received a grade-mark of ninety out of a possible one hundred in at least one-half of his college work.

COLORADO COLLEGE SCIENTIFIC SOCIETY.

The Colorado College Scientific Society was organized in 1890. Its objects are: "The discussion of recent scientific results, the promotion among its members of scientific inquiry and investigation, and the publication of the more important papers read at the meetings." Ten annual publications, entitled "Colorado College Studies," have been issued by the Society, and a large number of exchanges have been secured from associations of a like nature, including several foreign societies. In 1904 the work of publication was given over to the College.

The Secretary of the Society, to whom all correspondence, exchanges, etc., should be addressed, is Dr. Florian Cajori.

THE COLORADO COLLEGE PUBLICATION.

Under this title are now included the scientific works formerly issued as "Colorado College Studies", as well as the announcements

of the various departments of the College, the annual bulletin, the report of the President, etc. This publication appears every six weeks during the academic year. The following have been issued during 1906-07:

SCIENCE SERIES.

No. 47. Meteorological Statistics.—Professor F. H. Loud.
No. 48. Colorado Springs Weather Records, 1872-1903.—Chester M. Angell.
No. 49. The Evolution of the Snow-Crystal (2d paper).—J. C. Shedd.

GENERAL SERIES.

No. 20. Colorado College: Its Needs and Its Future.
No. 21. Annual Bulletin of Colorado College.
No. 22. Views of Colorado College.

COLLEGE LECTURE COURSE.

Since 1894 courses of lectures and single addresses have been given in Colorado Springs and other cities in the state. It is the purpose of the College to expand this work, as facilities and opportunities increase.

Following is the programme for 1906-07:

PROFESSOR L. A. E. AHLERS:
Ibsen's Dramas.
Brand.
Peer Gynt.

PROFESSOR FLORIAN CAJORI:
Soo, Suez and Panama.

PROFESSOR GEORGE I. FINLAY:
The Geology of the Rocky Mountain Region (2 lectures).

PROFESSOR E. D. HALE:
Romanticism and Classicism in Music (2 lectures).

PROFESSOR E. C. HILLS:
The Drama of Maeterlinck.

Mr. W. L. Sclater:
From the Cape to Cairo.

Professor John C. Shedd:
Newton and the Law of Gravitation.

Mr. H. E. Woodbridge:
Rousseau and Wordsworth.
Ibsen as an Idealist.

President Wm. F. Slocum:
A Summer Trip in Polar Regions.

OFFICERS OF THE ALUMNI ASSOCIATION.

Andrew Thompson, '00	President
Katriena Hayden, '04	Secretary
Hildreth Frost, '01	Treasurer

EXPENSES.

Tuition by the year..... $50.00

Students who register for less than eight hours of work pay the usual entrance fees and $10.00 for each half-year course. Any one wishing to attend lectures or recitations without receiving credit upon the College records may secure the privilege of such attendance on the payment of $5.00 for each half-year course.

Matriculation fee $5.00

(From the above named fees there is no rebate in case of withdrawal or dismissal.)

Athletic fee (voluntary).....	$5.00
Board in Montgomery Hall, a week (for young women)....	$3.00
Board in Hagerman Hall (club for young men), a week....	3.00
Board in Ticknor Hall (college table), a week.....	4.00
Rooms warmed, furnished and lighted, by the year, for each occupant .....$40.00 to	80.00

The number of rooms under $80 is limited. Applications should be made early. Rooms are rented by the year, and will be retained for incoming students only when the application is accompanied

by a deposit of $5. This fee will be credited on the bills for room rent, and will be refunded only in case the room is given up by September first.

Young men who room off the campus can obtain rooms at prices similar to those charged by the College.

Students who room in the College residences are required to furnish towels, bed linen and blankets.

Nurse's fee (for young women only: see p. 111)	$5.00
Fees of College physician:	
Office consultation	$ .50
Visits to rooms	1.00
Infirmary fee (including meals), a day	1.00

For prolonged illness and in cases of contagious disease, a special nurse is employed, and the expenses are charged to the patient.

The following is an estimate of the necessary expenses for the college year (not including matriculation fee, nurse's fee, cost of text-books, laundry, and incidentals):

Tuition, $25 per half-year	$ 50.00	$ 50.00
Room rent, $20 to $40 per half-year	40.00	80.00
Board, $3 to $4 per week, for 36 weeks	108.00	144.00
	$198.00	$274.00

In addition to these items, fees are charged for the use of apparatus and materials in connection with the following courses (these fees are paid directly to the respective departments at the beginning of each term):

Biology A	$ 2.50
Biology B, C, or H	4.00
Biology D, F, G, or J	3.00
Biology E or K	2.00
Chemistry A	7.00
Chemistry B	8.00
Chemistry C or D, each year's work	15.00
Chemistry E or G	15.00
Geology B	3.00

Physics, for each hour's credit	$4.00
Physics A, B, or H, book fee	.50

A voluntary athletic fee of $5.00 is generally paid by the students.

An additional charge of $5.00 is made on the last term bill of the Seniors to cover expenses of graduation.

The bills for tuition and room rent are issued at the beginning of each half-year, and are payable immediately. Students who withdraw before the end of the term pay full tuition. Students who withdraw less than six weeks before the end of the term pay full room rent. Board bills are payable monthly, in advance, and no rebate is made for absences of less than a week.

Remittances should be made by Draft or Money Order.

SCHOLARSHIPS.

The income of the following scholarships is devoted to the aid of worthy students who may need assistance in completing their course, and who, by their scholarship and character, prove themselves worthy of such assistance.

The Thomas Davee Scholarship of $500, established by the late Mrs. T. V. D. Mitchell, of West Minot, Maine.

The Rice Scholarship of $700, established by friends of the Rev. Chas. B. Rice, D. D., of Danvers, Mass.

The Currier Scholarship of $1,000, founded by the late Hon. Warren Currier, of St. Louis, Mo.

The Edwards Scholarship of $500, given by the Congregational Church of Wellesley Hills, Mass.

The Mary Caroline Quincy Scholarship of $500, given by the late George Henry Quincy, of Boston, Mass.

The Lawrence Myers Scholarship of $1,000, and the Lucy Platt Myers Scholarship of $1,000, given by Mrs. Lætitia M. Myers, of Plainfield, New Jersey.

The Fay Scholarship of $1,000, founded by the late Eliza A. Fay, of Boston, Mass.

A Scholarship of $1,000, given by Mr. William F. Richards, of

Colorado Springs, through the Woman's Educational Society of Colorado College.

The Willard B. Perkins Scholarship of $7,000. The second Willard B. Perkins Scholarship of $7,000. These two scholarships were given by the late Willard B. Perkins, of Colorado Springs.

The Hawley Scholarship Fund of the Woman's Educational Society, now amounting to about $10,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships of such young women of the College as the Faculty may recommend, preference being given to daughters of home and foreign missionaries.

The Hawley Scholarship Fund of Colorado College, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships for such students of the College as the Faculty may recommend who may be fitting themselves for distinctively Christian work.

The Hawley Memorial Fund, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., in memory of her husband, Mr. Martin Hawley, the annual income of which is loaned to "worthy and deserving students of the College, as the Faculty may see proper."

The Strettell Memorial Fund of $2,000, given by Mrs. Alma G. V. Harrison, of London, England, and General William J. Palmer, of Colorado Springs, in memory of Mr. Arthur E. V. Strettell, Mrs. Harrison's brother, who died in Colorado Springs in 1882. The income of this fund is to be used to aid students suffering from lung troubles.

The Mary G. Slocum Scholarship of $100 a year, given by the Woman's Educational Society of Colorado College. This scholarship is awarded on the basis of competition to young men of the Junior Class.

The Ruth Danforth Scholarship of $1,000, established by Mrs. Emma Danforth Wiley, of Colorado Springs.

Several other scholarships are supported by annual subscriptions.

SELF-SUPPORT.—Advanced students of high standing have occasional opportunities for private teaching. Capable and faithful young men can often find work in town. A limited amount of service in Montgomery and Ticknor Halls is offered to young women. This is not often available for first-year students.

PRIZES.

The Hastings Prizes.—The sum of $1,000 has been given by Mr. Frederic R. Hastings, of Colorado Springs, the income of which is to be used in providing prizes for sufficiently creditable theses produced by students in Philosophy K.

THE COLORADO COLLEGE PARK ASSOCIATION.

During the last five years the Colorado College Park Association has expended about $10,000 in parking the campus. General William J. Palmer has contributed towards its maintenance for five years by an annual contribution of $1,000.

THE WOMAN'S EDUCATIONAL SOCIETY.

This Society was formed in April, 1889, by the women of Colorado Springs. Its purpose, as expressed in its constitution, "is to give physical, intellectual and spiritual aid to students in any department of Colorado College." This Society built Montgomery Hall, furnished Ticknor and McGregor Halls, and has been of service in many ways to the College. Its members endeavor to come into personal relation with the students, especially with those who are supporting themselves; they try to find work for them and by friendly advice assist them in their efforts to secure an education. Loans are made on the following conditions:

First—Loans may be made to students who have been in the College for one term and are recommended by the Faculty as in every way deserving of such aid.

Second—No student shall be allowed to incur an indebtedness to the Society of more than $300.

Third—Students may receive loans without interest until their connection with the College ceases; after that time their notes shall draw interest at 4 per cent.

For the scholarships within the gift of the Society see pp. 127-128.

The officers for the current year are:

President—Mrs. William F. Slocum.
First Vice-President—Mrs. Francis W. Goddard.
Second Vice-President—Mrs. L. A. E. Ahlers.
Third Vice-President—Mrs. M. C. Gile.
Recording Secretary—Mrs. W. E. Fette.
Corresponding Secretary—Mrs. Edward S. Parsons.
Treasurer—Mrs. Florian Cajori.
Auditor—Mrs. Priscilla Sater Goodale.

HOSPITAL FUND.

The Trustees of the Bellevue Sanitarium have given to the College nearly $4,000 as the nucleus of a hospital fund for the students.

THE NEEDS OF THE COLLEGE.

Colorado College, never more truly than today, has great and pressing needs. Its growth during the last fifteen years has been steady and rapid, and its friends have generously assisted in helping it meet its constantly enlarging opportunity. But, while buildings have been provided fairly commensurate with the practical needs of its work, in other directions the College has entirely outgrown its resources. If it is to do the work which legitimately belongs to it and have its part in meeting the educational demands of the great section of country in which it is located, if it is to provide a thorough and broad training under positive Christian influences for those who are coming to it in constantly increasing numbers, not only from

Colorado, but from the entire country, it must have in the immediate future larger resources than those upon which it has been obliged to rely during the last few years.

Among the pressing needs are the following:

General Endowment.—For the last ten years the College has been doing a work equal in amount and quality to that done by older eastern institutions possessing three or four times its endowment funds. In consequence each year a deficit has had to be faced. At present a movement is under way to secure an additional $500,000 for the endowment fund. This is needed to pay the actual present running expenses of the College. A much larger sum must be provided if the College is to go forward to fill its place in the educational life of the country.

It is hoped that one form in which this large endowment will be bestowed is in the provision of permanent funds for individual professorships.

Funds for the Library.—The library has only a few hundred dollars of permanent funds. It must rely for increase upon gifts and upon purchases made out of current expense funds to meet the absolute requirements of the different departments. There is an imperative need first for money to be used at once in the filling of gaps in the material the library already possesses, and also for permanent funds from which additions may be regularly made in accordance with the varied intellectual needs of the College.

Special Funds for Scientific Research.—Money to be devoted to scientific work in special lines is very greatly needed. The opportunities of Colorado College in this direction are unusual, because of the geographical, meteorological and geological situation. The attention of those interested in the advancement of science is earnestly called to this fact.

Funds for the Engineering School.—This department of the College needs a considerable sum of money to be immediately expended in the proper development of its work, and also a large endowment fund to secure its stability and future growth. Large gifts bestowed for these ends will directly aid in the development of the rich resources of Colorado and the adjoining mountain states.

Residence Hall.—It is hoped that the young men may soon be provided with another residence hall, as the need is most pressing.

Scholarships.—The Trustees desire to emphasize the fact that many young people in a new country are obliged to earn their education by hard and self-denying work. Colorado College still needs a large addition to her scholarship funds. Money thus applied tends directly to the profit of the individual and of the country.

Fellowships.—It would be of great value in developing higher standards of scholarship if several graduate fellowships in various departments could be established.

Infirmary.—The Infirmary in Ticknor Hall, which is available for young women only, is inadequate to the growing needs of the College. There should be provided a separate building, in which contagious diseases can be cared for, as well as ordinary cases of illness. A fund has been started for the endowment of a cot to provide for illness among students who are working their way. Additions to this fund are an urgent need.

FORMS OF BEQUEST.

Those who intend to devise property to Colorado College, or to the Woman's Educational Society, are requested to employ one of the following Forms of Bequest:

"I hereby give, devise and bequeath unto The Colorado College of Colorado Springs, Colorado, the sum of.....Dollars."

"I hereby give, devise and bequeath unto the Woman's Educational Society of Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

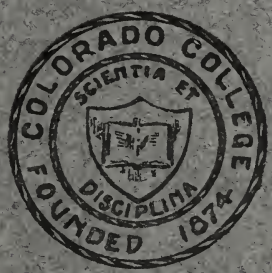
If property other than money is willed, the form should be correspondingly varied.

Colorado College Publication

Bulletin Series 34 General Series 34

BULLETIN

March, 1908



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Bulletin Series No. 34 General Series No. 34

THIRTY-FOURTH ANNUAL BULLETIN

OF

COLORADO COLLEGE

COLORADO SPRINGS, COLO.

1908

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Calendar

1908.

Mar. 24—Last day for registering for Hawley and Mary G. Slocum scholarships.....Tuesday
Mar. 28—**Spring Recess begins** at 1 p. m.....Saturday
April 7—**Spring Recess ends** at 8:15 a. m.....Tuesday
April 17—Good Friday: a holiday.....Friday
May 30—Memorial Day: a holiday.....Saturday
May 29—Examinations begin.....Friday
June 7—Baccalaureate Sermon.....Sunday
June 8—Class Day.....Monday
June 9—Annual meeting of Board of Trustees.....Tuesday
June 10—**Commencement** .....Wednesday
Sept. 15—Residence Halls open.....Tuesday
Sept. 15—Registration .....Tuesday
Sept. 16—**First Half-Year begins** at 8:15 a. m.....Wednesday
Sept. 19—Condition Examinations begin at 2 p. m.....Saturday
Nov. 11—Insignia Day.....Wednesday
Nov. 26—Thanksgiving Day: a holiday.....Thursday
Dec. 18—**Christmas Recess begins** at 5 p. m.....Friday

1909.

Jan. 5—**Christmas Recess ends** at 8: 15 a. m.....Tuesday
Jan. 25—Mid-Year Examinations begin.....Monday
Jan. 29—Trustees' Day.....Friday
Feb. 1—**Second Half-Year begins** at 8:15 a. m.....Monday
Feb. 7—Day of Prayer for Colleges.....Sunday
Feb. 22—Washington's Birthday: a holiday.....Monday
Mar. 23—Last day for registering for Hawley and Mary G. Slocum scholarships.....Tuesday
April 3—**Spring Recess begins** at 1 p. m.....Saturday
April 13—**Spring Recess ends** at 8:15 a. m.....Tuesday
May 30—Memorial Day.....Sunday
June 4—Examinations begin.....Friday
June 13—Baccalaureate Sermon.....Sunday
June 14—Class Day.....Monday
June 15—Annual meeting of Board of Trustees.....Tuesday
June 16—**Commencement** .....Wednesday

Historical Statement

Colorado College is the oldest institution of higher education in the State. In 1874, while Colorado was yet a territory, a College upon a broad Christian foundation was established in Colorado Springs. The authorized announcement for that year contains the following:

"It is the purpose of the Trustees to build a College in which liberal studies may be pursued under positive Christian influences. . . . The College is under no ecclesiastical or political control. Members of different churches are on its Board of Trustees. . . . The character which is most desired for this College is that of thorough scholarship and fervent piety, each assisting the other, and neither ever offered as a compensation for the defects of the other."

From the beginning, the Board of Trustees has been composed of leading professional and business men of Colorado, together with a few Eastern men of similar standing, and has ever been animated by the purpose avowed by the original Board.

A grant of land had been made in advance of the organization of the College, in 1873, by the Colorado Springs Company, the founders of the City of Colorado Springs. The Rev. Jonathan Edwards was the first professor and executive officer. The first President, the Rev. James Dougherty, was elected in 1875, and was succeeded in the following year by the Rev. E. P. Tenney. From 1885 to 1888 there was no President, but the work of teaching was carried on without interruption. At this time there was only one building on the campus, Palmer Hall, now known as Cutler Academy, erected in 1880.

In the autumn of 1888 William Frederick Slocum was elected President. The faculty was at once enlarged, the courses reorganized, and Cutler Academy incorporated as an associated preparatory school, in which students have since been trained, not only for Colorado College, but for all the leading institutions of the United States. A residence for the President was purchased. Within two years $100,000 was given toward endowment, entirely from within Colorado. Hagerman Hall was built in 1889. In the same year the

Woman's Educational Society was organized and built Montgomery Hall.

The following buildings have been erected since that time: The N. P. Coburn Library, 1894; the Henry R. Wolcott Observatory, 1894; Ticknor Hall, 1897; Perkins Fine Arts Hall, 1900; McGregor Hall, 1903; Palmer Hall, 1903. The President's residence was remodeled and enlarged in 1903.

In 1903 a School of Engineering was opened to meet the increasing demand in the Rocky Mountain region for instruction in applied science. The number of engineering students already enrolled has encouraged the Trustees to develop this department to the fullest degree of efficiency.

Through the generosity of General William J. Palmer and Doctor William A. Bell, who in 1905 presented to the College a tract of land called Manitou Park, the foundation has been laid for a School of Forestry. The School opened in 1906, with Doctor William C. Sturgis as Dean.

In December, 1907, the raising of a $500,000 endowment fund was completed. This, added to the previous endowment, gave a total fund of over $900,000.

The growth of the institution in many directions, and the steady elevation of its standards of work have won for it an assured position. It is able to offer to its students educational facilities of the same grade as are found at Eastern institutions of the higher learning.

Trustees

William F. Slocum, *President of the Board* - 24 College Place.

Willis R. Armstrong - - - - - - - - 21 W. Uintah St.

George W. Bailey - - - - 309 McPhee Building, Denver.

Hon. John Campbell - - - - - 1401 Gilpin St., Denver.

Rev. James B. Gregg, D. D. - - - - - - - 9 E. Dale St.

J. J. Hagerman - - - - - - - - - - Roswell, N. M.

Thomas S. Hayden - - - - 1637 Sherman Ave., Denver

Irving Howbert - - - - - - - - - 17 N. Weber St.

William S. Jackson - - - - - - - - 228 E. Kiowa St.

William Lennox - - - - - - - - 1001 N. Nevada Ave.

Horace G. Lunt - - - - - - - - 431 N. Cascade Ave.

Charles M. MacNeill - - - - - - - - 28 W. Bijou St.

William J. Palmer - - - - - - - - Out West Building.

George Foster Peabody - - - - 54 William St., New York.

Philip B. Stewart - - - - - - - - 1228 Wood Ave.

Mahlon D. Thatcher - - - - - - Hill Crest, Pueblo.

Frank Trumbull - - - - - - - 71 Broadway, New York

Standing Committees of the Trustees

EXECUTIVE.

Horace G. Lunt, *Chairman;* George W. Bailey, John Campbell, James B. Gregg, J. J. Hagerman, George Foster Peabody.

FINANCE.

William S. Jackson, *Chairman;* John Campbell, Irving Howbert, William Lennox, Charles M. MacNeill, William J. Palmer, Philip B. Stewart, Mahlon D. Thatcher, Frank Trumbull.

FORESTRY SCHOOL.

William J. Palmer, *Chairman;* Irving Howbert, Philip B. Stewart.

GROUNDS AND BUILDINGS.

William J. Palmer, *Chairman;* Willis R. Armstrong, Thomas S. Hayden, William Lennox, Philip B. Stewart.

INSTRUCTION.

Philip B. Stewart, *Chairman;* James B. Gregg, Horace G. Lunt.

College Officers

William F. Slocum, President.

Edward S. Parsons, Vice-President.

Frank H. Touret, Treasurer.

Mrs. Priscilla Sater Goodale, Assistant Treasurer.

Board of Control of the N. P. Coburn Library

Chairman—President Slocum.

Secretary—Manly D. Ormes.

Miss A. R. Bell.

Miss Ellen T. Brinley.

Prof. Florian Cajori.

Mr. Clarence P. Dodge.

Mrs. W. E. Fette.

Mrs. G. A. Fowler.

Prof. M. C. Gile.

Mrs. E. C. Goddard.

Rev. James B. Gregg, D. D.

Mr. C. W. Haines.

Mr. H. C. Hall.

Mr. S. F. Hamp.

Mrs. Robert Kerr.

Judge H. G. Lunt.

Miss Dorothy Palmer.

Prof. E. S. Parsons.

Mrs. Chas. Peabody.

Mrs. W. F. Slocum.

Mrs. Philip B. Stewart.

Rev. A. N. Taft.

Mrs. A. E. Touzalin.

Mrs. F. H. Weeks.

Faculty

WILLIAM FREDERICK SLOCUM, D.D., LL.D. 24 College Place.

President and Head Professor of Philosophy.

A. B. (Amherst), '74; B. D. (Andover), '78; LL.D. (Amherst), '93; LL.D. (Nebraska), '94; D.D. (Beloit), '01; LL.D. (Illinois College), '04; Colorado College, '88.

GUY H. ALBRIGHT, PH. B., A. B. 1220 N. Custer St.

Instructor in Mathematics.

PH. B. (Michigan), '99; A. B. (Harvard), '00; Colorado College, '07.

J. ROY ARMSTRONG, B. S. Ivywild.

Professor of Electrical Engineering.

B. S., E. E. (Armour Institute of Technology), '05; Colorado College, '05.

ALFRED A. BLACKMAN, M. D. 801 N. Nevada Ave.

Medical Adviser.

M. D. (University of Denver), '02; Colorado College, '04.

ERNEST BREHAUT, A. M. Broadmoor.

Professor of Latin.

A. B. (Dalhousie), '94; A. B. (Harvard), '96; A. M. (*ibid.*), '97; Colorado College, '98.

MARIANNA BROWN, A. M. McGregor Hall.

Registrar and Instructor in Latin.

A. B. (Earlham College), '76; A. M. (Cornell), '94; Colorado College, '02.

FLORIAN CAJORI, PH. D. 1119 Wood Ave.

Dean of the School of Engineering, and Head Professor of Mathematics.

S. B. (Wisconsin), '83; M. S. (*ibid.*), '86; PH. D. (Tulane), '94; Colorado College, '89.

DUNBAR FREDERICK CARPENTER, A. M., LL. B. 420 N. Cascade Ave.

Lecturer on Law of Contracts.

A. B. (Harvard), '00; A. M. (*ibid.*), '01; LL. B. (*ibid.*), '03; Colorado College, '07.

CHARLES G. COLLAIS, M. E. 30 W. Cache la Poudre St.

Superintendent of Mechanical Laboratories.

M. E. (Armour Institute of Technology), '07; Colorado College, '03.

GEORGE IRVING FINLAY, PH. D. 205 W. Uintah St.

Professor of Geology, Mineralogy and Paleontology.

A. B. (Harvard), '98; PH. D. (Columbia), '03; Colorado College, '03.

CLARENCE JAMES FOREMAN, M. S., A. M. 829 N. Weber St.

Professor of Political and Social Science.

B. S. (Michigan A. C.), '94; M. S. (*ibid.*), '96; A. M. (Michigan), '01; Colorado College, '07.

RUTH GILBERT, A. B. Montgomery Hall.

Instructor in Biology.

A. B. (Colorado College), '07; Colorado College, '07.

M. CLEMENT GILE, A. M.* 1121 N. Tejon St.

Head Professor of Classical Languages and Literatures.

A. B. (Brown), '83; A. M. (*ibid.*), '86; Colorado College, '92.

CLYDE T. GRISWOLD, A. B., E. M. 1203 N. Tejon St.

Professor of Mining and Metallurgy.

A. B. (Amherst), '03; E. M. (Columbia), '05; Colorado College, '07.

HENRY C. HALL, A. B., LL. B. 1401 Wood Ave.

Lecturer on Law.

A. B. (Amherst), '81; LL. B. (Columbia), '83; Colorado College, '03.

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*On leave of absence 1907-8.

FREDERIC R. HASTINGS, A. M. 1501 Wood Ave.

Lecturer on History of Philosophy.

PH. B. (Colorado College), '91; A. M. (*ibid.*), '92; Colorado College, '99.

ELIJAH CLARENCE HILLS, PH. D., LITT. D. 120 Tyler Place.

Head Professor of Romance Languages and Literatures.

A. B. (Cornell), '92; (*ibid.*), '92-'93; University of Paris, '93-'94; PH. D. (University of Colorado), '06; LITT. D. (Rollins College), '06; Colorado College, '02.

GEORGE MAXWELL HOWE, PH. D. 1617 N. Tejon St.

Professor of Germanic Languages and Literatures.

A. B. (Indiana University), '94; PH. D. (Cornell), '01; Colorado College, '07.

RUTH LOOMIS, A. B. Ticknor Hall.

Dean of Women.

A. B. (Vassar), '85; Colorado College, '96.

FRANK HERBERT LOUD, PH. D.* 1203 N. Tejon St.

Professor of Mathematics and Astronomy, Emeritus.

A. B. (Amherst), '73; A. M. (Harvard), '99; PH. D. (Haverford), '00; Colorado College, '77.

GEORGE JOHN LYON, B. Sc., C. E. Tyler Place.

Professor of Civil Engineering.

B. Sc. (Nebraska), '99; C. E. (Columbia), '04; Colorado College, '04.

HOWARD MOORE, C. E. 1140 Wood Ave.

Assistant Professor of Graphics.

C. E. (Princeton), '93; Colorado College, '03.

ATHERTON NOYES, A. B. 10 E. Columbia St.

Assistant Professor of English.

A. B. (Yale), '85; Colorado College, '92.

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* Retired on the Carnegie Foundation.

MANLY D. ORMES, A. B., B. D. 1617 N. Tejon St.

Librarian.

A. B. (Yale), '85; B. D. (*ibid.*), '89; Colorado College, '04.

JAMES WILLIAMS PARK, A. B. 328 E. Columbia St.

Head Master of Cutler Academy and Instructor in Public Speaking.

A. B. (Amherst), '03; Colorado College, '07.

CHARLES W. D. PARSONS, A. B. Hagerman Hall.

Professor of Physics.

A. B. (Cornell), '97; Colorado College, '07.

EDWARD S. PARSONS, A. M., B. D., LITT. D. 1130 Wood Ave.

Vice President, Dean and Bemis Head Professor of English.

A. B. (Amherst), '83; A. M. (*ibid.*), '86; B. D. (Yale), '87; LITT. D. (Amherst), '03; Colorado College, '92.

SIDNEY F. PATTISON, A. B.† Y. M. C. A.

Professor of English.

A. B. (Rochester), '98; A. B. (Williams), '99; Colorado College, '99.

YNA REINHARDT, A. B. 221 E. Uintah St.

Instructor in French, German, and Spanish.

A. B. (Colorado College), '06; Colorado College, '06.

HENRY ALFORD RUGER, A. M. Tyler Place.

Assistant Professor of Philosophy and Education.

A. B. (Beloit), '95; A. M. (Chicago), '05; Colorado College, '04.

MARIE A. SAHM, A. B. 2027 N. Tejon St.

Instructor in German and Italian and in the History of Art.

A. B. (Colorado College), '07; Colorado College, '07.

EDWARD C. SCHNEIDER, PH. D. 218 E. Uintah St.

Head Professor of Biology.

B. S. (Tabor), '97; PH. D. (Yale), '01; Colorado College, '03.

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† On leave of absence, 1907-08.

WILLIAM LUTLEY SCLATER, M. A. 1511 Wood Ave.

Director of the Museum and Lecturer on Comparative Anatomy.

B. A. (Oxford), '85; M. A. (*ibid.*), '90; Colorado College, '06.

HENRY FRANCIS SMITH, A. B., B. D. South Hall.

Assistant Professor of Biblical Literature.

A. B. (Beloit), '97; B. D. (Yale), '03; Colorado College, '06.

ORRIE W. STEWART, A. B. Colorado City.

Instructor in Chemistry.

A. B. (Colorado College), '06; Colorado College, '06.

WILLIAM STRIEBY, A. M., E. M. 805 N. Cascade Ave.

Professor of Chemistry and Metallurgy.

A. B. (University of New York), '75; E. M. (Columbia School of Mines), '78; A. M. (University of New York), '79; Colorado College, '80.

WILLIAM CODMAN STURGIS, Ph. D. Las Pampas.

Dean of the School of Forestry and Lecturer on Vegetable Pathology.

A. B. (Harvard), '84; A. M. (*ibid.*), '87; Ph. D. (*Ibid.*), '89; Colorado College, '03.

LAURA VESTA TANNER, A. B. Montgomery Hall.

Instructor in English.

A. B. (Colorado College), '07; Colorado College, '07.

O. B. WILLCOX, LL. B. 1515 Wood Ave.

Lecturer on Law.

LL. B. (Michigan), '89; Colorado College, '04.

H. A. WINKENWERDER, M. F.

Assistant Professor of Forestry.

B. S. (Wisconsin), '02; M. F. (Yale), '07; Colorado College, '07.

HOMER E. WOODBRIDGE, A. M. 1612 N. Tejon St.

Instructor in English.

A. B. (Williams), '02; A. M. (Harvard), '04; Colorado College, '06.

MARY HELEN WOODSMALL, A. B. South Hall.

Instructor in Physical Training.

A. B. (Colorado College), '07; Colorado College, '06.

EDWARD DANFORTH HALE, A. M. 1123 N. Weber St.

Dean of the School of Music and Professor of the Theory and Literature of Music, and the Pianoforte.

A. B. (Williams), '80; A. M. (*ibid.*), '83; Professor at the New England Conservatory, '85-'04; Colorado College, '05.

MRS. ROBERT BRISCOE. 805 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95; Colorado College, '00.

MRS. FREDERICK A. FAUST. 112 E. Dale St.

Instructor in Pianoforte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

MRS. GEORGE MAJORS PERRY. 110 St. Vrain Court.

Instructor in Voice Culture.

Oberlin Conservatory, '98-'02; Pupil of Mrs. Seabury Ford, William Saal, Felix Hughes, Herbert Witherspoon; Colorado College, '05.

Committees of the Faculty

Accredited Schools: Mr. Ruger, Mr. Lyon, Mr. Park.

Athletics: Mr. Park, Mr. Moore, Mr. Armstrong, Miss Woodsmall.

Courses of Study of Individual Students: Mr. E. S. Parsons, Mr. Noyes, Mr. Schneider, Miss Brown, Miss Loomis.

Discipline: Mr. Slocum, Mr. E. S. Parsons, Mr. Cajori, Mr. Schneider, Miss Loomis.

Engineering: Mr. Cajori, Mr. Lyon, Mr. Armstrong, Mr. Collais.

Extension Lectures: Mr. Woodbridge, Mr. Noyes, Mr. Finlay.

Forestry: Mr. Sturgis, Mr. Winkenwerder, Mr. Schneider.

Fraternities: Mr. Cajori, Mr. E. S. Parsons, Mr. Foreman, Miss Loomis.

Hagerman Hall: Mr. C. W. D. Parsons, Mr. Schneider, Mr. Lyon, Mrs. Cajori, Mrs. C. W. D. Parsons, Mrs. Slocum, Mrs. E. S. Parsons, Mrs. Touret.

Library: Mr. Ormes, Mr. Howe, Miss Reinhardt, Miss Tanner.

Music: Mr. Hale, Mrs. Faust, Miss Sahm.

Post-Graduate Degrees: Mr. Hills, Mr. Cajori, Mr. E. S. Parsons, Mr. Schneider.

Publication: Mr. Slocum, *Editor-in-Chief;* Mr. Cajori, *Managing Editor;* Mr. Howe, *Secretary;* Mr. Hills, Mr. E. S. Parsons, Mr. Schneider.

Bulletin: Mr. Brehaut, Mr. Smith, Mr. Woodbridge.

Publicity: Mr. Hills, Mr. Cajori, Mr. Noyes, Mr. Smith.

Schedule: Mr. Noyes, Mr. Lyon, Mr. E. S. Parsons, Mr. Albright.

Scholarships: Mr. Slocum, Mr. Cajori, Mr. E. S. Parsons, Miss Brown, Miss Loomis.

Students' Self-Help: Mr. Ruger, Mr. Strieby, Mr. Moore, Mr. Collais.

Class Officers: *Seniors,* Mr. Slocum; *Juniors,* Mr. Foreman; *Sophomores,* Mr. Schneider; *Freshmen,* Mr. Hills; *Special Students,* Mr. Noyes.

Student Government: Mr. Slocum, Miss Loomis, Mr. E. S. Parsons, Mr. Schneider, Miss Brown, Miss Tanner.

Admission

REGISTRATION.

Before registering, each candidate must present to the Dean a certificate of moral character, signed by some responsible person in the community in which he has made his home. Students are required to register promptly and attend the first exercises in their courses.

ENTRANCE REQUIREMENTS.

1. English, 3 units.*
2. History, 1 unit.
3. Mathematics, 2 units (preferably 3).
4. Latin, German, or French, 4 units, of which 2 must be Latin.
5. Science, 2 units (to be selected from the list of sciences given below in 6; but the student is advised to offer Chemistry and Physics. If the student offers Greek, only one unit of Science is required).
6. Electives, sufficient to make a total of 16 units.
   English, 1 unit.
   Greek, 1, 2 or 3 units.
   German, 1 or 2 units.
   French, 1 or 2 units.
   Spanish, 1 or 2 units.
   Mathematics, 1 unit.
   History, 1 unit.
   Civil Government, ½ unit.
   Chemistry, 1 unit.
   Physics, 1 unit.
   Physiology, ½ unit.
   Zoology, ½ unit.

*A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 45 minutes each a week.

Botany, ½ unit.
Physiography, ½ unit.
Geology, ½ unit.
Mechanical Drawing, 1 unit.

UNIT COURSES IN PARTICULAR SUBJECTS.

1. English—(3 units).

(*a.*) A practical knowledge of grammar and the elements of rhetoric.

(*b.*) A thorough study of the subject matter and style of the following works, recommended by the Joint Conference on Uniform Entrance Requirements in English:

1907-11. Shakespeare's *Macbeth;* Milton's *Lycidas, Comus, L'Allegro,* and *Il Penseroso;* Burke's *Speech on Conciliation with America,* or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration;* Macaulay's *Life of Johnson,* or Carlyle's *Essay on Burns.*

(*c.*) A careful but not minute study of the following works, sufficient to give the candidate a clear idea of their important parts:

1907-11. Group I. (two to be selected): Shakespeare's *As You Like It, Henry V., Julius Caesar, The Merchant of Venice, Twelfth Night.*

Group II. (one to be selected): Bacon's *Essays;* Bunyan's *The Pilgrim's Progress,* Part I.; The Sir Roger de Coverley Papers in *The Spectator;* Franklin's *Autobiography.*

Group III. (one to be selected): Chaucer's *Prologue;* Spenser's *Faerie Queene,* (selections); Pope's *The Rape of the Lock;* Goldsmith's *The Deserted Village;* Palgrave's *Golden Treasury* (First Series), Books II. and III., with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

Group IV. (two to be selected): Goldsmith's *The Vicar of Wakefield;* Scott's *Ivanhoe, Quentin Durward;* Hawthorne's *The House of the Seven Gables;* Thackeray's

Henry Esmond; Mrs. Gaskell's *Cranford;* Dickens' *A Tale of Two Cities;* George Eliot's *Silas Marner;* Blackmore's *Lorna Doone.*

Group V. (two to be selected): Irving's *Sketch Book;* Lamb's *Essays of Elia;* De Quincey's *Joan of Arc* and *The English Mail Coach;* Carlyle's *Heroes and Hero Worship;* Emerson's *Essays* (selected); Ruskin's *Sesame and Lilies.*

Group VI. (two to be selected): Coleridge's *The Ancient Mariner;* Scott's *The Lady of the Lake;* Byron's *Mazeppa* and *The Prisoner of Chillon;* Palgrave's *Golden Treasury* (First Series), Book IV., with especial attention to Wordsworth, Keats, and Shelley; Macaulay's *Lays of Ancient Rome;* Poe's *Poems;* Lowell's *The Vision of Sir Launfal;* Arnold's *Sohrab and Rustum;* Longfellow's *The Courtship of Miles Standish;* Tennyson's *Gareth and Lynette, Lancelot and Elaine,* and *The Passing of Arthur;* Browning's *Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Pheidippides.*

Although the books mentioned above are recommended as preparation for this part of the requirement, they are not prescribed. Books of equal merit, covering a similar range of literary types, will be accepted as equivalents.

2. History—(1 unit). An outline knowledge of the leading facts of either Ancient, Greek and Roman, Mediæval and Modern, American, or English history.

(*a.*) Ancient History: Myers and Botsford, Myers, West, or an equivalent.

(*b.*) Greek and Roman: Botsford, Allen, or an equivalent.

(*c.*) Mediæval and Modern: Myers, or an equivalent.

(*d.*) American: Channing, McLaughlin, Thomas, Johnston, Montgomery, or an equivalent.

(*e.*) English: Larned, Coman and Kendall, Montgomery, or an equivalent.

3. Mathematics—(2 units; preferably 3).

(*a.*) Algebra, through simultaneous quadratic equations (1 unit).

(*b.*) Elementary Plane Geometry: the first five books of Phillips and Fisher's, Wells', or Wentworth's *Geometry,* or an equivalent (1 unit).

(*c.*) Solid and Spherical Geometry (½ unit).

(*d.*) Plane Trigonometry (½ unit).

It is recommended that Algebra and Plane Geometry be reviewed in the last year of the preparatory course.

4. Latin—(*a.*) An accurate and ready knowledge of grammatical forms. *Caesar's Gallic Wars,* Bks. I.-IV., or an equivalent. Prose Composition based on Cæsar. Careful attention should be given from the beginning to correct pronunciation of the Latin and to the use of idiomatic English in translation. (2 units.)

(*b.*) Cicero: seven orations. The following are recommended: The four orations against Catiline, Archias, the Manilian Law, Marcellus. Translation at sight of easy passages of prose. Prose Composition. (1 unit.)

(*c.*) Vergil: *Aeneid,* Bks. I.-VI. Prose Composition based on Cicero. (1 unit.)

5. Greek—(*a.*) White's *First Greek Book,* or an equivalent. Xenophon's *Anabasis* (20 or 30 pages). Practice in sight translation. The rules of accentuation. (1 unit.)

(*b.*) Four books of the *Anabasis.* Reading at sight. Prose Composition based on the *Anabasis.* Careful grammatical study. (1 unit.)

(*c.*) Three books of the *Iliad* with prosody and dialectic forms. Sight translation. Prose Composition. (1 unit.)

6. German, French and Spanish—(1 or 2 units). (*a.*) The work of the first year should comprise: (1) Drill in the rudiments of grammar; (2) careful drill in pronunciation; (3) the memorizing and frequent repetition of easy colloquial sentences; (4) abundant easy exercises; (5) the reading

in graduated texts of from 75 to 100 pages of German, or from 100 to 175 pages of French or Spanish prose.

(*b.*) The work of the second year should comprise: (1) The careful reading of from 150 to 200 pages of German literature, or from 250 to 400 pages of French or Spanish literature, in the form of easy stories or historical or biographical sketches; (2) accompanying practice, as before, in the translating from English of easy variations from the matter read, and also in off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill in the rudiments of grammar.

A good selection of texts for the second year, arranged in suitable order for reading, would be:

GERMAN: Andersen, *Maerchen* or *Bilderbuch;* Leander, *Traeumereien;* Hauff, *Das kalte Herz;* Zschokke, *Der zerbrochene Krug;* Hillern, *Höher als die Kirche;* Storm, *Immensee;* Baumbach, *Der Schwiegersohn;* Heyse, *L'Arrabiata, Das Maedchen von Treppi, Anfang und Ende;* Jensen, *Die Braune Erica.*

FRENCH: (1) Mairet, *la Tâche du petit Pierre;* Malot, *Sans famille,* or Bruno, *le Tour de la France;* (2) Labiche et Martin, *le Voyage de M. Perrichon;* Halévy, *l'Abbé Constantin,* or Mérimée, *Colomba;* (3) Dumas, *la Tulipe noire,* or Erckmann-Chatrian, *Madame Thérèse;* (4) Sarcey, *le Siège de Paris,* or Lamartine, *Jeanne d'Arc;* (5) Daudet, *Contes,* or George Sand, *la Mare au diable.*

SPANISH: (1) Valera, *El pájaro verde,* and Alarcón, *El Capitán Veneno,* or about 100 pages of Padre Isla's version of *Gil Blas;* (2) Pérez Galdós, *Doña Perfecta* or *Marianela;* (3) Echegaray, *Ó locura ó santitad,* Ramos y Vidal, *Zaragüeta,* or Moratin, *El sí las niñas.*

A third and a fourth year of German or French will be accepted as an elective entrance subject if the work has been done satisfactorily. Candidates are advised to present two units of German, French, or Spanish, as preparatory to

admission to the German B, French B, or Spanish B, given in the College.

7. Physics—(1 unit). Not less than two hours a week of recitation, and four of laboratory work; Millikan and Gale's *First Course in Physics;* Carhart and Chute's *Elements of Physics,* or an equivalent.

8. Chemistry—(1 unit). Williams' *Elements of Chemistry,* or an equivalent.

9. Physiology—(½ unit). Textbook work should cover such a text as Blaisdell's *Practical Physiology.* In addition, the course should include a rough dissection, by the teacher; of the frog and cat, and a microscopic examination of the more important tissues.

10. Zoology—(½ unit). Textbook work equal in amount to that contained in Kellogg, Jordan or Davenport; laboratory work on the structure of at least ten forms and a comparison with other types. The drawings and descriptions in the candidate's laboratory note-book must be certified by the teacher.

11. Botany—(½ unit). The requirements include a knowledge of the structure and more important physiological processes of flowering plants, also of the modifications of parts for special functions, of the plant societies, pollenation and dissemination. It is also desirable that the candidate have the ability to identify ordinary seed plants. A laboratory notebook certified by the teacher must be presented by the candidate. Such texts as Bergen's *Foundation of Botany* and Coulter's *Plant Studies* are recommended.

12. Physiography—(½ unit). Tarr, Davis, Dryer, or an equivalent.

13. Geology—(½ unit). Scott's *Introduction to Geology,* or an equivalent, with practice in the determination of the commoner rocks, igneous, sedimentary and metamorphic.

14. Mechanical Drawing—(1 unit).

ADMISSION BY CERTIFICATE.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to the above requirements, will be admitted without condition into the Freshman Class. Each candidate must bring from the principal of the school last attended a personal statement as to his grade of scholarship.

ACCREDITED SCHOOLS.

The following schools are on the accredited list. Certificates of the satisfactory completion, in any of them, of any branch in the course of study required for admission to the College, will be accepted in place of an examination.

Aspen High School.
Canon City High School.
Canon City So. Side High School.
Central City High School.
Cheyenne (Wyo.) High School.
Colorado Springs High School.
Cripple Creek High School.
Delta High School.
Denver High School.
East Denver High School.
North Denver High School.
West Denver High School.
Denver Manual Training High School.
Douglas Co. H. S., Castle Rock.
Durango High School.
Eaton High School.
Florence High School.
Fort Collins High School.
Fort Morgan High School.
Fruita High School.
Georgetown High School.
Glenwood Springs High School.
Golden High School.
Gordon Academy, Salt Lake City.
Grand Junction High School.
Greeley High School.
Gunnison High School.
Idaho Springs High School.
Leadville High School.
Littleton High School.
Longmont High School.
Loveland High School.
Manitou High School.
Manzanola High School.
Monte Vista High School.
Montrose High School.
Morgan Park, Illinois, High School.
Omaha, Nebraska, High School.
Otero Co. High School, La Junta.
Ouray High School.
Pueblo High School, Dist. No. 1.
" High School, Dist. No. 20.
Saguache Co. High School..
Salida High School.
Telluride High School.
Trinidad High School.
Victor High School.
Walsenburg High School.
Wheat Ridge High School, Alcott.
Miss Wolcott's School, Denver.
Wolfe Hall, Denver.

Certificates from schools not on the accredited list will be considered as the merits of each case may warrant.

ADMISSION BY EXAMINATION.

Candidates for admission, unless admitted by certificate, must pass examinations in the requirements indicated above. Such examinations will be held in Palmer Hall on Tuesday, September 15, 1908.

ADMISSION TO ADVANCED STANDING.

Students will be received into advanced classes on examination in the studies previously pursued. The Faculty may, at their discretion, receive certificates from other colleges as evidence that the student has satisfactorily pursued those or equivalent studies.

SPECIAL STUDENTS.

Special students will be received, at the discretion of the Faculty, into such classes as they are qualified to enter. It is the rule of the College that such students must attend the examinations as well as the ordinary recitations of their classes, subject to the same conditions as other students.

Several of the courses of lectures which form part of the College instruction, particularly in the department of Philosophy, are open to the public on payment of a fee of $5.00 for each half-year course (see p. 128), and without any requirements of examination.

Course of Study

In the College, only one degree is given, that of Bachelor of Arts. To secure this the student is required to complete a course of study consisting of (1) certain prescribed studies, (2) a specified numbers of hours in a major subject, (3) enough free electives to bring his work up to the total requirement of 60 hours, making an average of 15 hours a week throughout the four years.

PRESCRIBED STUDIES.

FRESHMAN YEAR.....Mathematics A (1), A (2), A (3), 3 hours.
English B, 3 hours.

1. Greek; Latin; and German, French or Spanish.
2. Greek; German, French or Spanish; and Science.
3. Latin; German, French or Spanish; and Science.
4. German; French or Spanish; and Science.

Each subject in the above four groups comes three times a week. For Astronomy, Plane Trigonometry is a prerequisite; for Geology, one year of Chemistry is a prerequisite. If the student does not elect Science in the Freshman year, he must take it in the Sophomore year.

SOPHOMORE YEAR.....English C and D, 3 hours.
History, 2 hours.
A Science, 3 hours. (If not taken in the Freshman year.)

Philosophy A and B must be taken in Sophomore year by all intending to take their majors in Philosophy or Education.

JUNIOR YEAR.....Philosophy A and B, 3 hours.
Economics A, first half-year, 2 hours.

SENIOR YEAR.....Philosophy C and D, 4 hours.

MAJOR SUBJECT.

In addition to the above prescribed subjects, each student shall select a major subject, if possible before the end of the Sophomore year, and, in any case, not later than the beginning of the Junior year. The professor in charge of the major subject will act as the student's adviser, and will have authority, with the Dean, to require the completion of work amounting to 15 hours in the major subject, or in the major subject and in such minor subjects as he shall consider necessary, or collateral, work. Mention of the major subject will be made in the diploma.

Any one of the following may be selected by the student as his major subject: (1) Philosophy; (2) Education; (3) Greek; (4) Latin; (5) English; (6) German; (7) Romance Languages; (8) Economics and Political Science; (9) History; (10) Mathematics; (11) Astronomy; (12) Physics; (13) Chemistry; (14) Biology; (15) Geology.

All courses except English B and C, Mathematics A, French A, German A, and Spanish A, may be counted as part of the requisite 15 hours.

Petitions to change the major subject will be granted only when approved by the professors in charge of both the old and the new subjects, and when granted, the student will be held to all the requirements of the new major subject. In no case may the major subject be changed later than the beginning of the Senior year.

ELECTIVES.

The student shall elect, in addition to the prescribed subjects and the major subject, a sufficient number of courses to bring the total amount of his College work up to 60 hours.

Departments of Instruction

PHILOSOPHY.

President Slocum, Assistant Professor Ruger.

The required work in this department extends over the Junior and Senior years, and gives the student a knowledge of the development of thought in the several departments of philosophy. The various seminary courses afford training in the study and discussion of important psychological, sociological and ethical questions.

A. *Psychology.*—Required of all Juniors. First half-year, 3 hours.—Assistant Professor Ruger.

1. *Neurology.* Anatomy and physiology of the nervous system. The neurone concept, architecture of the central nervous system and sense-organs, onto- and phylogenetic development. Auzoux and Deyrolle models of the brain, cranial nerves, and spinal cord, stereopticon slides, and a collection of human and animal brains and cranial casts furnish suitable illustrative material.

2. *General Psychology.* The general characters and problems of consciousness; structural and functional points of view in psychology. Lectures, demonstrations, experiments by the class, recitations, and papers on special topics. The equipment of the Psychological Laboratory is drawn upon for demonstration material. Texts, Judd's *Psychology,* and Titchener's *Primer of Psychology.* References.

B. *Logic.*—Required of all Juniors. Second half-year, 3 hours. Logic treated from the standpoint of functional psychology. Text, Creighton's *Logic.* Collateral reading.—Assistant Professor Ruger.

C. *History of Philosophy.*—Required of all Seniors. Prerequisite, Philosophy B. First half-year, 4 hours.—President Slocum.

1. *Lectures, Recitations and Conferences.*—3 hours.

(*a.*) Study in Comparative Religions.

(*b.*) Greek Philosophy. 20 lectures.

(*c.*) Modern Philosophy. Lectures: (1) The Rise and Fall of Scholasticism; (2) The Beginnings of Modern Philosophy — Bacon and Descartes; (3) Spinoza; (4) Locke; (5) The Skeptical Movement in France; (6) Leibnitz; (7) Berkeley; (8) Hume; (9) Kant, The Critique of Pure Reason; (10) Kant, The Transcendent Element in his Philosophy; (11) Hegel; (12) Schopenhauer; (13) Lotze; (14) Spencer—The Philosophy of Evolution.

2. *Metaphysical Seminary.*—1 hour.

Papers and discussion upon the following subjects:

(*a.*) Great Religions of the World.

(*b.*) Psychological Basis of Religious Faith.

(*c.*) Psychological Basis of Aesthetics.

(*d.*) Philosophical Thought in England during the Nineteenth Century.

(*e.*) Evolution: Its History, Development and Results.

D. *Ethics.*—Required of all Seniors. Prerequisite, Philosophy C. Second half-year, 4 hours.—President Slocum.

1. *Janet's Theory of Morals.*—Lectures, theses and discussions, 3 hours.

(*a.*) The Fundamental Principles of Ethics. 12 lectures.

(*b.*) Christian Ethics. 3 lectures.

2. *Ethical Seminary.*—1 hour.

Papers and discussion upon the following subjects:

(*a.*) Modern Social and Sociological Problems.

(*b.*) The Ethical View of Citizenship.

(*c.*) A Study of Educational Theories from an Ethical Standpoint.

E. *Modern German Philosophy.*—First half of Senior year, 2 hours. —President Slocum.

F. *The Philosophical Movement in England.*—Second half of Senior year, 2 hours.—President Slocum.

G. *Contemporary Problems in Philosophy.*—Pragmatism. 2 hours. Second half-year.—Assistant Professor Ruger.

H. *Modern Philosophy.*—Reading course in Descartes, Locke and Berkeley. 2 hours, first half-year.—Assistant Professor Ruger.

I. *Modern Philosophy.*—Continuation of Phil. H. Hume and Kant. 2 hours, second half-year.—Assistant Professor Ruger.

K. *The Evolution of Religious Thought.*—Second half-year, 2 hours.—Mr. Hastings.

(1) Psychological Basis of Religion; (2) Spiritual Import of Greek Philosophy; (3) Religious Development of the Hebrews; (4) Rise of Christianity; (5) Source and Substance of Revelation; (6) Paul and his Mission; (7) Fusion of Greek and Christian Thought; (8) Mediæval Conceptions of Christianity; (9) Spirit of the Renaissance; (10) Cardinal Principles of the Reformation; (11) Philosophical Awakening; (12) Eighteenth Century Conceptions of Religion; (13) Skepticism; (14) Voltaire and Rousseau; (15) Lessing and Freedom of Thought; (16) Philosophy of Kant; (17) German Idealism; (18) Mysticism; (19) Romanticism; (20) Goethe: Religion and Culture; (21) German Criticism of Dogma; (22) Coleridge and Wordsworth; (23) Carlyle and his Philosophy of Life; (24) Newman and the Church Revival; (25) Rise of the Critical Mind; (26) Comte and his Religion of Humanity; (27) Agnosticism; (28) Religious Import of Evolution; (29) Arnold and Ethical Idealism;

(30) Martineau and Christian Theism; (31) Philosophical Idealism; (32) Present-Day Tendencies in Religious Thought.

L. *Experimental Psychology.*—A laboratory course. Experimental methods and typical experiments both qualitative and quantitative. Psychological tests and their applications to school problems. The equipment of the laboratory is described under the title, Laboratories and Apparatus. 3 hours, two laboratory sessions and one class hour.—Assistant Professor Ruger.

M. *Advanced Course in Psychology.*—Special topics. Class reports and discussions. 2 hours, second half-year.—Assistant Professor Ruger.

N. *Advanced Course in Psychology.*—The problems of Functional Psychology. The psychology of cognition, including a discussion of methods of learning, the process of judgment, invention. Some experimental work bearing on the problems will be done. 2 hours, first half-year.—Assistant Professor Ruger.

O. *Psychology of Play and of Aesthetics.*—1 hour, first half-year.—Assistant Professor Ruger.

P. *Psychology of Religion.*—Starbuck, James, Davenport, King, Ames, etc. The genetic and functional points of view in the interpretation of the religious consciousness. 1 hour, second half-year.

EDUCATION.

Assistant Professor Ruger.

A. *History of Education.*—A study of the more important educational theories and movements in their larger relationships. The historical problems are treated as far as possible from the standpoint of social psychology, and their relation to present day questions is emphasized. Monroe's *Textbook in the*

History of Education is used as a basis. Plato's *Republic,* Comenius' *The Great Didactic,* and Rousseau's *Emile,* are carefully studied in class. Special reports on other classics and educational topics by members of the class. 3 hours, first half-year.

B. *Genetic Psychology.*—Kirkpatrick's *Fundamentals of Child Study* is used as a point of departure. Class reports and discussions. 3 hours, first half-year.

C. *Research Work in Problems of Educational Psychology.*—For graduate students and advanced undergraduates. Hours to be arranged.

E. *Principles of Teaching.*—Thorndike, *Principles of Teaching,* Bagley, *Class-room Management;* lectures on the Philosophy of Education. Especial attention is given to the psychological bases of educational methods. Class reports and discussions. 3 hours, second half-year.

G. *Educational Classics.*—2 hours.

H. *Animal Psychology.*—A study of recent experimental results and methods. Comparison with human methods of learning and educational bearings. Simple experiments will be employed. Texts, Washburn, Kirkpatrick. References to recent literature. 2 hours, second half-year.

I. *Mental Development in the Race.*—Primitive religion, art, morality, invention, etc., treated from the psychological and educational points of view. 2 hours, second half-year.

Practice-Teaching.—In connection with courses "A" and "E," there is opportunity for a limited amount of practice teaching. Cutler Academy and the high and graded schools of Colorado Springs, Colorado City and Manitou afford considerable opportunity for substitute teaching.

Note.—For courses in other departments intended especially for teachers see Greek F, Latin H, German L, French F, Mathematics D, Physics B.

GREEK.*

PROFESSORS GILE AND BREHAUT.

A. Homer, selections from the *Odyssey* and *Iliad* in the original and all the poems in translation; Plato, *Apology* and *Crito;* Herodotus, selections.—3 hours.

B. *Drama.*—Aeschylus, *The Septem* and *Prometheus;* Sophocles, *Antigone;* the remainder of Aeschylus' and Sophocles' plays in translation; Euripides, *Alcestis* and *Medea.*—3 hours.

C. *History.*

(*a.*) Herodotus; careful study of the period of the Persian Wars. Reading from the dramatists for further illustration of the life of the period; or,

(*b.*) Thucydides, the Sicilian Expedition. Parallel readings in Curtius, Grote and other modern historians. Selections from Plutarch's *Lives.* One-half year, 3 hours.

D. *Philosophy.*—Plato, *Phaedo.* Selections from other dialogues, and from the works of Xenophon. Zeller's *Socrates and the Socratic Schools.* One half-year, 3 hours.

E. *Epic and Lyric Poetry.*—Homer, Hesiod and Pindar. One half-year, 3 hours.

F. *A Course Designed for Teachers.*—Selections from Xenophon; composition; careful grammatical study. One half-year, 3 hours.

I. *New Testament Greek.*—Open to students who have had one year of Greek. Second half-year, 3 hours.

H. *Greek History.*—An outline from the earliest times down to 146 B. C. A knowledge of Greek is not required. Second half-year, 2 hours.

NOTE.—For a course in Greek Drama for English readers, see English V.

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* Students who enter without Greek are permitted to take, as College work, courses in Greek in Cutler Academy.

LATIN.

PROFESSORS GILE AND BREHAUT.

A. Cicero, *De Senectute, De Amicitia, Selected Letters;* Horace, *Odes.*—3 hours.

B. Horace, Selections from the *Epistles* and *Satires;* Tacitus, *Germania* and *Agricola;* Terence, *Phormio;* Plautus, *Captivi;* Pliny, *Selected Letters.*—3 hours.

C. *Drama.*—Selected plays of Plautus and Terence; history and characteristics of the Roman Drama. One half-year, 3 hours.

D. *Catullus and the Elegiac Poets.*—One half-year, 3 hours.

E. *Satire.*—History and characteristics of Roman Satire. Selections from Horace, Persius, Juvenal. Parallel readings in English literature. One half-year, 3 hours.

F. *Prose Literature of the Empire.* — Gudeman's Selections. 3 hours.

G. *Vergil.—The Aeneid,* Books VII.-XII.; the *Bucolics,* and Selections from the *Georgics.* One half-year, 3 hours.

H. *A Course Designed for Teachers.*—Selections from Cæsar and Cicero; composition; careful grammatical study. One half-year, 3 hours.

J. *Roman History.*—An outline from the earliest times to the fall of the Roman Empire. A knowledge of Latin is not required. Second half-year, 3 hours.

ENGLISH.

PROFESSORS PARSONS AND PATTISON, ASSISTANT PROFESSOR NOYES, MR. WOODBRIDGE, MISS TANNER, MRS. SMITH.

B. *Rhetoric and Composition.*—Elementary Course. Required of all Freshmen. 3 hours.

C. *Argumentation.*—Prerequisite, Course B. Required of all Sophomores. First half-year, 3 hours.

T. *Advanced Composition.*—Prerequisite, Course C. This course may be taken as a half course in either half-year. 2 recitations, 3 hours' credit.

D. *American Literature.*—Required of all Sophomores. Irving, Cooper, Poe, Bryant, Hawthorne, Longfellow, Emerson, Lowell, Holmes, Whittier. Second half-year, 3 hours.

S. *Outline History of English Literature.*—First half-year, 3 hours.

G(1). *Chaucer.*—The principal poems read critically in class. Life and thought of the times. First half-year, 3 hours.

G(2). *Spenser.*—Second half-year, 3 hours.

H(1).* *The English Drama: Through Marlowe.*—Principles and development. First half-year, 3 hours. Given in 1908-09 and alternate years.

H(2).* *The English Drama: From 1590 to 1642, exclusive of Shakespeare.* Second half-year, 3 hours. Given in 1908-09 and alternate years.

I. *The English Drama: Shakespeare.*—The principal plays read chronologically. Second half-year, 3 hours.

J. *Shakespeare.*—A careful study of the language of three or four dramas of Shakespeare. Second half-year, 3 hours.

K(1). *Milton.*—Poetry and Prose. Given in alternate years; omitted in 1908-09. First half-year, 3 hours.

K(2). *Milton.*—A more detailed study of *Paradise Lost.* Second half-year, 1 hour. Given in alternate years; omitted in 1908-09.

L.* *English Poetry from Dryden to Burns.*—First half-year, 3 hours.

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* Not open to Freshmen or Sophomores.

M.* *Wordsworth, Coleridge, Byron, Shelley, Keats.*—Second half-year, 3 hours.

N.* *Tennyson and Browning.*—First half-year, 3 hours.

O.* *Modern English Prose.*—J. S. Mill, Carlyle, Newman, Arnold, Ruskin. Second half-year, 3 hours.

P. *Old English.*—The beginnings of English Literature. Reading is begun at once and the study is made as literary in character as possible. First half-year, 3 hours.

Q. *Old English.*—Beowulf. Prerequisite, Course P. Second half-year, 3 hours.

R.* *Lyrics.*—Second half-year, 3 hours.

U.* *Nineteenth Century Novelists.*—Jane Austen, Scott, Dickens, Thackeray, George Eliot, Stevenson, Hawthorne. Two recitations; collateral reading; 3 hours' credit.

V.* *Greek Drama for English Readers.*—Literary study of Aeschylus and Sophocles in poetic translation; lectures on the Greek Theater and on Greek Art. Second half-year, 3 hours.

PUBLIC SPEAKING.*

Mr. Park.

A. *Declamations.*—Oral interpretation; declamations; individual training. 1 hour.

B. *Debates.*—Lectures; examples for praxis; oral interpretation; orations; discussions; extemporaneous speaking; debates on social, economic, historical and political questions. 3 hours.

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* Not open to Freshmen or Sophomores.

†See Oratorical and Debating Contests, p. 124.

GERMAN LANGUAGE AND LITERATURE.*

PROFESSOR HOWE, MISS REINHARDT, MISS SAHM.

A. *Elementary Course.*—Grammar, Reading, Composition, Conversation. Andersen's *Märchen; Immensee, Aus dem Leben eines Taugenichts.* 3 hours.

B. *Intermediate Course.*—Prerequisite, Course A. *Wilhelm Tell, Minna von Barnhelm, Die Journalisten;* Composition. 3 hours.

C. *Scientific German.*—Prerequisite, German A. For Engineering students only. 2 hours.

D. *Composition.*—Prerequisite, Course A. German Prose Composition and German Syntax—von Jagemann. First half-year. 2 hours.

E. *Composition.*—Prerequisite, Course D. Continuation of Course D. Second half-year. 2 hours.

F. *German Lyrics and Ballads,* especially those of Heine and Uhland. Prerequisite, Course B. First half-year, 2 hours.

ADVANCED COURSES.

G. Lessing.—Prerequisite, Courses B and D. *Miss Sara Sampson, Emilia Galotti, Natan der Weise;* biographical sketch. Second half-year, 2 hours.

H. Schiller.—Prerequisite, Courses B and E. *Die Räuber, Don Carlos, Wallenstein, Maria Stuart, Die Jungfrau von Orleans* or *Wilhelm Tell, Die Braut von Messina;* Poems, Nollen's edition; biographical sketch. Three of the above works will

* If any course continuing throughout the year is dropped before the end of the year, no credit will be given for the work of the first half-year.

be read by the student outside of class. 3 hours. Given in 1909-10 and alternate years.

I. Goethe.—Prerequisite, Courses E, F, and G or H. (*Götz von Berlichingen), (Die Leiden des jungen Werther), Egmont, Iphegenie auf Tauris, Torquato Tasso, Hermann und Dorothea, Faust, (Dichtung und Wahrheit),* Lyrics, (Lewes' *Life of Goethe*). The works within parentheses will be read by the student outside of class. Students whose major subject is German may take Courses F, G, and I at the same time. 3 hours. Given in 1908-09 and alternate years.

J. *Standard Prose Works of the Nineteenth Century.*—Prerequisite, Course H or I. A large number of works will be read both in and out of class without translation, the purpose of the course being to acquaint the student, as far as possible, with works of literature read by educated Germans. 2 hours. Given in 1908-09 and alternate years.

K. *The German Drama of the Nineteenth Century.*—Prerequisite, Course H or I. The works will be read as in Course J. Kleist, Grillparzer, Hebbel, Ludwig; Gutzkow, Wildenbruch, Fulda; Sudermann, Hauptmann. Especial attention will be given to the life and works of Kleist, Grillparzer, and Hebbel. 2 hours. Given in 1909-10 and alternate years.

L. *Teachers' Course.*—Prerequisite, at least two Advanced Courses. A study of German pronunciation and grammar from the standpoint of the teacher. Instruction as to methods, texts, and works of reference. 1 hour. In the year 1908-09 Courses D and E must be taken with this course.

Any of the Advanced Courses may be taken by candidates for the Master's degree, but in every case a greater amount of collateral work will be required of such candidates than of undergraduate students.

FRENCH LANGUAGE AND LITERATURE.*

PROFESSOR HILLS AND MISS REINHARDT.

A. *Elementary Course.*—Fraser and Squair's *French Grammar;* Aldrich and Foster's *French Reader;* Alfred de Musset, *Pierre et Camille;* Labiche et Martin, *le Voyage de M. Perrichon.* Writing from dictation, and practice in speaking. Two divisions, Aa and Ab. 3 hours.

B. *Intermediate Course.*

1. *Syntax and Prose Composition.* Fraser and Squair's *French Grammar,* and composition. 1 hour.

2. *Modern Prose and Poetry.* George Sand, *La Mare au diable;* Daudet, *la Belle-Nivernaise;* Augier et Sandeau, *le Gendre de M. Poirier;* Anatole France, *le Livre de mon ami;* Bowen's *French Lyrics.* Lectures (2). 2 hours.

   For outside reading: About, *le Roi des montagnes;* Balzac, *Eugénie Grandet, Ursule Mirouet;* Coppée, *Pour la couronne;* Daudet, *le Petit Chose, Tartarin de Tarascon, Tartarin sur les Alpes;* Dumas, *les Trois mousquetaires, la Tulipe noire;* Erckmann-Chatrian, *le Conscrit de 1813, Waterloo;* Feuillet, *le Roman d'un jeune homme pauvre;* Gréville, *Dosia;* Victor Hugo, *Notre Dame de Paris;* Mæterlinck, *la Vie des Abeilles;* Malot, *Sans famille;* Mérimée, *Colomba;* Ohnet, *le Maître de Forge;* Saintine, *Picciola;* Souvestre, *Un philosophe sous les toits;* Verne, *le Tour du monde en 80 jours, Vingt mille lieues sous les mers;* Vigný, *la Canne de jonc, Cinq-mars.* Each student is expected to read two of these works out of colss, and pass examination upon them. Other standard works, if approved by the instructor, may be read in the place of those given in the list.

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*If any course continuing throughout the year is dropped before the end of the year, no credit will be given for the work of the first half-year.

C. *Classical French Literature.*—The following works will be read in class: Corneille, *le Cid, Horace;* Racine, *Andromaque, Athalie;* Molière, *les Précieuses ridicules, le Bourgeois gentilhomme, l'Avare;* Boileau, *l'Art poétique;* La Fontaine, *Fables.* Lectures. 2 hours. Given in alternate years; omitted in 1908-09.

Outside Reading.—Each student is expected to read the following out of class, and pass examination upon them: (1) Mme. de La Fayette, *la Princesse de Cléves;* Saint-Pierre, *Paul et Virginie;* (2) Chateaubriand, *Attala* and *René;* (3) Lamartine, *Graziella;* (4) Victor Hugo, *les Misérables* (*extraits*); (5) Balzac, *Eugénie Grandet.*

D. *Nineteenth Century Literature.*—Prerequisites, Courses A and B. The following works will be read in class: Victor Hugo, *Hernani, Préface de Cromwell, Poésies* (*extraits*); Lamartine, *Méditations* (*extraits*); Alfred de Musset, *On ne badine pas avec l'amour, Poésies* (*extraits*); Sainte-Beuve, *Selected Essays;* Rostand, *Cyrano de Bergerac.* Lectures. 2 hours. Given in 1908-09 and alternate years.

Outside Reading.—Each student is expected to read the following out of class, and pass examination upon them: (1) Zola, *la Débâcle;* (2) Ernest Renan, *Souvenirs d'enfance et de jeunesse;* (3) Anatole France, *le Crime de Sylvestre Bonnard;* (4) Pierre Loti, *le Pêcheur d'Islande;* and (5) Mæterlinck, *les Aveugles, l'Intérieur, Monna Vanna.*

F. *Advanced Prose Composition.*—Prerequisites, French A and B. 1 hour. Given in alternate years; omitted in 1908-09.

I. *French Phonetics, and Colloquial French.*—Prerequisites, French A and B. Matzke's *Primer of French Pronunciation* (revised edition) and Kron's *French Daily Life* (Rippman). 1 hour. Given in 1908-09 and alternate years.

J. *Nineteenth Century Fiction.*—Prerequisites, Courses A, B, and C or D. The members of this class will meet individually with the instructor. To each student will be assigned the more important works of fiction and the biographies of two or more writers. Written reports will be required. Not less than 5,000

pages will be read. The final examination will cover not only the works read, but also the student's ability to read French prose with ease and accuracy. 2 hours. Students desiring this course must consult the instructor.

H. *Old French.*—Clédat's edition of the *Chanson de Roland.* 1 hour. Open only to Juniors, Seniors, and Graduates, who have had Latin and French A, B, and C or D. Given in 1908-09 and alternate years.

SPANISH LANGUAGE AND LITERATURE.*

PROFESSOR HILLS AND MISS REINHARDT.

A. *Elementary Course.*—Hills and Ford's *Spanish Grammar;* Ramsay's *Spanish Reader;* Valera, *El Pájaro verde;* Alarcón, *El capitán Veneno.* Writing from dictation, and practice in speaking. 3 hours. Two divisions: Aa for college students, and Ab for engineering students. Students may not elect Spanish A and Italian A in the same year.

B. *Modern Spanish Literature.*—Moratín, *El sí de las niñas;* Pérez Galdós, *Electra;* Echegaray, *El poder de la impotencia;* Hills' *Bardos Cubanos.* Lectures (2). Bi-weekly exercises in prose composition. 2 hours. Given in alternate years; omitted in 1908-09.

For outside reading: Alarcón, *El escándalo, El final de Norma, El niño de la bola, El sombrero de tres picos;* "Caballero," *La familia de Alvareda;* Isaacs, *María;* Palacio Valdés, *La aldea perdida;* Pardo Bazán, *De mi tierra, Los pazos de Ulloa;* Pereda, *Don Gonzalo González;* Pérez Galdós, *Doña Perfecta, Marianela, Gloria* (2 vols.); *Juan Valera, Doña Luz, Pepita Jiménez.* Each student is expected to read two of

*If any course continuing throughout the year is dropped before the end of the year, no credit will be given for the work of the first half-year

these works out of class, and pass examination upon them. Other standard works, if approved by the instructor, may be read in the place of those given in this list.

C. *Classical Spanish Literature.*—Prerequisite, Course A. Padre Isla's version of *Gil Blas;* Cervantes, *Don Quijote* (extracts); Calderón, *El mágico prodigioso.* Lectures (2). For outside reading see Course B. 2 hours. Given in 1908-09 and alternate years.

D. *Contemporaneous Spanish Fiction.*—The members of this class will meet individually with the instructor. To each student will be assigned the more important works of fiction and the biographies of two or more writers. Written reports will be required. Not less than 4,000 pages will be read. The final examination will cover not only the works read, but also the student's ability to read Spanish prose with ease and accuracy. Prerequisites, Courses A, B and C. Students desiring this course must consult the instructor.

E. *Colloquial Spanish.*—Prerequisites, Spanish A, and B or C. Román y Salamero, *El castellano actual.* 1 hour. Given in 1908-09 and alternate years.

F. *Advanced Spanish* in the School of Engineering.—2 hours.

ITALIAN LANGUAGE AND LITERATURE.*

PROFESSOR HILLS AND MISS SAHM.

A. *Elementary Course.*—Grandgent's *Italian Grammar;* Bowen's *Italian Reader;* Goldoni, *Il vero amico;* Manzoni, *I promessi sposi.* 2 hours. Given in alternate years; omitted in 1908-09. Students may not elect Italian A and Spanish A in the same year.

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*If any course continuing throughout the year is dropped before the end of the year, no credit will be given for the work of the first half-year.

B. *Italian Literature of the Thirteenth and Fourteenth Centuries,* with an especial study of Petrarca and Dante. Lectures and collateral reading. 2 hours. Given in 1908-09 and alternate years.

ECONOMICS.

PROFESSOR FOREMAN.

A systematic course in the elements of Political Economy is followed by elective courses in special subjects.

A. *Elementary Economics.*—Required of all Juniors. A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, followed by lectures and assigned reading on the general principles of production, exchange, distribution and consumption. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law, or journalism, the general rules and principles contributed to business by the science of economics. First half-year, 2 hours.

B. **Charities and Corrections.*—First, a series of lectures on the theory and history of charity and reformatory work; second, a study of the dependent class, with special reading on the slum conditions in our large American cities; third, a study of the delinquent class, the causes and prevention of crime, prison management and discipline. Charitable and correctional institutions in the vicinity will be visited, and special lectures will be given by men who have given special attention to some phase of these subjects. Second half-year, 3 hours. Given in 1908-09.

C. **Money and Banking.*—The history and theory of money, credit and banking. The evolution of metallic currency; the posi-

* Prerequisite, Economics A.

tion of the Bimetallists and the Quantity Theorists; credit, credit instruments, paper money, convertible and inconvertible notes, modern currency problems and foreign banking systems are studied with special reference to American currency and banking. Lectures, recitations, reports and discussions. First half-year, 3 hours. Given in 1908-09 and every alternate year.

D. **Socialism.*—An historical and critical course in socialism and socialistic theory. Especial attention is paid to the historical basis of socialism, the French Revolution, the idealists, the German scientific socialists, the Christian socialists, the State socialism of today, and also to the various attempts at socialistic reforms. Lectures and recitations. First half-year, 3 hours. Given in alternate years; omitted in 1908-09.

E. **Colonial Policy.*—The theories of colonization and the economic ideas and institutions underlying the modern expansionist movement; a brief history of the colonial experiments of the great colonizing nations of the world: Spain, Portugal, Holland, France, England, Russia and Germany; a brief account of commercialism past and present, and of modern trade theories. Lectures and recitations supplemented by a textbook. First half-year, 2 hours.

F. **Labor Problems.*—This course is designed to follow Course A and to alternate with Course I. A study of some of the practical problems arising out of the relation of capital and labor, such as strikes, trades unions, arbitration, immigration, factory legislation and child labor. Second half-year, 2 hours. Given in 1908-09 and every alternate year.

G. **Public Finance.* A survey of the whole field of public finance, including (*a.*) public revenues, their nature, classification and characteristics, with special emphasis on taxation; (*b.*) public expenditures, their classification and relation to public welfare and to governmental functions; (*c.*) the budget and its preparation in the great countries of the world; (*d.*) public credit, its nature, employment, industrial effects and administration.

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* Prerequisite, Economics A.

Lectures, recitations and collateral reading in Adams', Seligman's and Ely's works. Second half-year, 3 hours. Given in 1908-09.

H. **Economic Theory.*—Designed for graduates and under-graduates who have had sufficient preparation. After a brief survey of the theories of rents, wages and profits advanced by the classical economists, the more recent theories are studied with special reference to Marshall, Clark and Patten, McFarlane, Bohm-Bawerk, etc. Second half-year, 3 hours.

I. **The Development of Industrial Society.*—A study of English and American industrial history to the present time. This course is intended to follow Economics A and to alternate with Course F. Lectures, text-book, and recitations. 2 hours. Given in 1907-08 and every alternate year.

K. *Principles of Sociology.*—A study of individual characteristics, of social groups, and of social processes with the view of establishing principles and laws. Lectures, text-book, and recitations. 3 hours. Given in 1907-08 and every alternate year.

L. **Problems in Sociology.*—A study of the laws of population, the immigration question, poor relief, vagrancy, crime, the divorce problem, the development of cities, and other sociological questions of the present time. Lectures, text-book, and collateral reading. 3 hours. Given in 1907-08 and every alternate year.

P. *Transportation Problems.*—The development of railway transportation in Europe and in this country; a study of the railway problems of the United States; the industrial significance of modern transportation; methods of government control of railways. Lectures, text-book and recitations. 3 hours. Given in 1908-09 and every alternate year.

J. **Problems in Political Economy.*—Industrial reforms; distribution of private property; the railway problem; trades-unions; the trust problem, co-operation, profit sharing, communism, social-

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* Prerequisite, Economics A.

ism. Lectures, text-book, and recitations. 3 hours. Given in 1907-08 and every alternate year.

M. **Distribution of Wealth.*—The laws governing productive efficiency of various industries; the nature of private property and its position in the social and economic order; the industrial sphere of the State; the industrial constitution; contract and its conditions; shares of the various factors in distribution. Lectures, text-book, assigned reading. 2 hours. Given in 1908-09 and every alternate year.

N. *Commercial Law.*—The law of contracts, agency, partnership, corporations, commercial paper, insurance, sales, etc. This course is intended to alternate with Law A. Text-book supplemented by lectures. 3 hours. Given in 1908-09.

O. **Senior Seminary.*—Each student who takes his major in Economics, History, or Political Science, is required to prepare a thesis, in his Senior year, on a subject approved by the instructor. This thesis must be typewritten and bound according to specifications furnished by the Librarian. After the thesis has been accepted by the instructor, it becomes the property of the College. While preparing the thesis, the student is required to meet the instructor at least once every week to report on work done and to discuss theory, bibliography, etc. 1 hour.

POLITICAL SCIENCE.**

PROFESSOR FOREMAN.

A. *Historical Politics.*—The origin and growth of government from its primitive forms to the establishment of the modern states, the semi-amorphous horde, gentile society, the ancient city, the Athenian democracy, the Greek confederations, the Roman

* Prerequisite, Economics A.

** See Economics O.

republic and empire, the Germanic folk, the feudal system, the political system of the church, the Holy Roman empire, the rise of national states, the development of absolute and constitutional monarchy, the growth of democracy, etc. Lectures supplemented by recitations and reports. Text: Wilson's *State*. First half-year, 3 hours. Given in 1907-08 and every alternate year.

B. *Comparative Politics.*—A study and comparison of the governments of the chief modern States; an exposition of the constitutional law of the United States and England and of their actual political organization. The great problems of federalism and centralization, presidential and responsible ministerial government, colonial government and civil liberty, receive especial consideration. Lectures, recitations and collateral reading. Second half-year, 3 hours. Given in 1907-08 and every alternate year.

For other courses in Political Science see Economics E and Law A and B.

HISTORY.†

PROFESSOR FOREMAN.

A. *English History.*—Required of all Sophomores. The political history of England from the earliest times to the American Revolution. Recitations and collateral reading, supplemented by lectures on the constitutional and economic development. Throughout the year. 2 hours.

B. **American History.*—A general survey, with emphasis on political and economic history. In special cases the course may be elected for one half-year. 3 hours.

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† For courses in Greek and Roman History, see Greek H and Latin I. See also Economics O.

* History A is a prerequisite to all history courses, except Greek H and Latin I.

(*a.*) First half-year: To the close of the Revolution.

(*b.*) Second half-year: From the Revolution to the present time.

C. **The Napoleonic Era and Modern Times.*—The history of Western Europe in the nineteenth century. Second half-year, 2 hours. Given in 1907-08 and every alternate year.

D. **Modern History to the French Revolution.*—History D and C constitute one continuous course. First half-year, 2 hours. Given in alternate years; omitted in 1908-09.

E. **Mediaeval History.*—A survey of the general history of Continental Europe through the period which lies between Ancient and Modern history. 2 hours. Given in 1908-09 and every alternate year.

H. *The History of the West to 1850.*—A study is made of the various physiographic provinces of the United States, the early colonial settlements, the subsequent westward migration, and the resulting political, economic, and social conditions. Lectures and assigned reading. 2 hours.

G. *Seminary in American History.*—Attention will be given to the British colonial system, the colonial governments, and the conflict of ideas and policies which led to the American Revolution. 3 hours.

THE HISTORY OF ART.

Miss Sahm.

A. *An Outline Study of the History of Art.*—Open to Juniors and Seniors. Recitations and lectures. 2 hours.

(1.) *Ancient Art.* A study of the architecture, sculpture and painting of Egypt, Assyria, Persia, Greece,

* History A is a prerequisite to all history courses, except Greek H and Latin I.

Etruria and Rome. Especial stress will be laid on Greek art and its perfect expression of Greek ideals. First half-year.

(2.) *Mediaeval and Renaissance Art.* Outline study of the Early Christian, Byzantine, Romanesque and Gothic periods in Italy, France and England. The most important work will be an appreciative study of the Renaissance in Italy. Second half-year.

LAW.

PROFESSOR FOREMAN, MR. HALL, MR. CARPENTER, MR. WILLCOX, MR. RITTER.

The courses in Law are the equivalent of, and secure credit for, one year's work in the principal law schools of the country. The work has been arranged with a view to meeting the wants of students who, not intending to practice law, nevertheless desire a thorough foundation in the general principles on which Anglo-Saxon jurisprudence is based, as well as of those who intend to complete their studies and enter upon the practice of the profession.

A. *Elementary Law.*—A general view of the whole field of law and an introduction to its terminology and fundamental ideas. In addition to a careful study of a standard text-book the student is required to do collateral reading in Blackstone's and Kent's commentaries. First half-year, 3 hours.—MR. RITTER.

B. *American Constitutional Law.*—The general principles of constitutional law of the United States, their interpretation and practical application; the origin and development of the written constitution in America. Recitations and lectures supplemented by a study of the leading cases on constitutional law. Second half-year, 3 hours.—PROFESSOR FOREMAN.

C. *Contracts.*—Mutual assent and the necessity of its communication; offers and their expiration or revocation; necessity of consideration; requisites of contracts under seal; rights of beneficiaries and assignees; joint and several contracts; alter-

native contracts; conditional contracts; illegality; impossibility; duress; discharge of contracts, or causes of action arising under them by recession, novation, accord and satisfaction, release and other means. Texts: Anson on Contracts; Longwell and Williston's Cases on Contracts. 2 hours. Given in 1907-08 and every alternate year.—Mr. Carpenter.

D. *Torts.*—The nature of torts; historical development; principles of liability; limitation of personal capacity; effect of a party's death; liability for the torts of agents and servants; general exceptions, inevitable accident, leave and license, necessity and self-defense; remedies; assault and battery; imprisonment; the family and business relation; defamation; wrongs of fraud and malice; wrongs to possession and property; trespass, waste, conversion, justification and excuse; nuisance; negligence, contributory negligence; special relations of contract and tort. Texts: Webb's Pollock on Torts; Ames and Smith's Cases on Torts. 2 hours. Given in alternate years; omitted in 1907-08.—Mr. Willcox.

E. *Domestic Relations and the Law of Persons.*—Infancy: period of infancy; voidable acts, disaffirmance, ratification; contracts for necessaries; obligations created or authorized by law; liability for tort; guardian and ward. Marriage: promise to marry; marriage contract at common law and under statutes; rights of husband and wife in each other's property; status of married women; transactions between husband and wife; torts affecting marital relations; separation; divorce. Parent and child: custody, service and earnings. Texts: Tiffany on Domestic Relations, Woodruff's Cases on Domestic Relations. 2 hours. Given in 1907-08 and every alternate year.

F. *Property.*—Real and personal property; ownership of land; natural servitudes; easements; covenants as to use; public rights; franchises; rents, tenures; uses and trusts; joint ownership; estates; remainders, executory limitations; common law assurances and conveyances under the Statute of Uses. Texts: 207 to 508, Chase's Blackstone; Gray's Cases on Property. 2 hours. Given in alternate years; omitted in 1907-08.—Mr. Willcox.

G. *Mining Law.*—The mining laws of foreign countries; the policy of the United States, and Federal legislation concerning mineral lands; lands in the United States subject to appropriation under the mining laws, and the persons who may acquire rights therein; state legislation and local district regulations supplementing the Federal laws; the vein, apex, dip; the discovery, location and record of lode and placer claims; tunnel claims; coal lands, salines, mill sites; the nature and extent of property rights acquired by lode and placer locations; cross lodes, the extra-lateral right, known lodes; annual labor, abandonment, forfeiture, resumption of work, re-location; proceedings to obtain U. S. Patent, the adverse claim, action to determine adverse claims, the patent; actions and remedies; rights and obligations arising out of agreement between the parties. Texts: Lindley on Mines and selected cases. 1 hour. Given in 1907-08 and every alternate year.—Mr. Hall.

MATHEMATICS.

Professor Cajori and Mr. Albright.

A(1). *Algebra.*—Series; Variation; the Binomial Theorem; Logarithms; Undetermined Coefficients; Permutations and Combinations; Theory of Equations. First half-year, 3 hours.

A(2). *Solid and Spherical Geometry.*—Planes and lines in Space; Polyhedra, the Cylinder, Cone and Sphere; Spherical Triangles. Second half-year, 2 hours.

A(3). *Plane Trigonometry.*—The functions of one and two angles; the solution of triangles; De Moivre's theorem; simple applications. Second half-year, 3 hours.

B(1). *Analytical Geometry (Elementary).*—Plane loci of first and second order. First half-year, 3 hours.

B(2). *Analytical Geometry (More Advanced).*—More thorough study of plane loci, some attention being given to modern methods. Second half-year. 2 hours.

C. *Calculus, Differential and Integral.*—First half-year, 3 hours. Second half-year, 4 hours.

D. *History and Logic of Mathematics.*—This course is planned especially for those who are fitting themselves to be teachers of mathematics. One half-year, 2 hours.

E. **Projective Geometry.*—One half-year, 3 hours.

F. **Theory of Equations.*—One half-year, 3 hours.

G. **Differential Equations.*—One half-year, 2 hours.

H. **Determinants.*—One half-year, 2 hours.

J. *Theoretical Mechanics.*—Prerequisite, Course C. This course is intended especially for students of engineering and mathematical physics. 4 hours.

I. *Elementary Surveying.*—Field work and computation. Fee, $4. Second half-year: 8 hours, field work; 2 hours, recitation: counts 3 hours.

ASTRONOMY.

Mr. Albright.

A. *General Astronomy.*—Introductory and descriptive. Second half year, 4 hours.

B. *Observations and Computations.*—Prerequisite, Mathematics A (3). Astronomy A is recommended in preparation. Use of the equatorial and transit instrument and the solution of problems based upon the results of the student's observations. First half-year, 3 hours (including the observatory work counted as laboratory periods).

E. *Practical Astronomy.*—Determination of latitude, longitude, azimuth and time by means of the sextant, engineer's transit and

* Of Courses E, F, G and H, only one is given in any one half-year.

chronometer. First half-year, 3 hours (including field work counted as laboratory periods).

PHYSICS.

Prof. Chas. W. D. Parsons.

The aim of the courses offered in this department is: (1.) To give an elementary knowledge of the fundamental principles of the subjects studied. To this class belong courses A, B, and H. (2.) To give a working knowledge to those expecting to teach. For this purpose there are offered, on the theoretical side, courses C, D and G; on the experimental side, course E. (3.) To meet the needs of the student of pure science. To this class belong courses F and K.

A. *General Physics* for candidates for the A. B. degree. No mathematics is required beyond that necessary for entrance to college. Experimental lectures and recitations, 3 hours; laboratory work, one period of two hours (counts 3 hours).

First half-year: Mechanics, Sound, Light.

Second half-year: Heat, Magnetism, Electricity.

B. *General Physics* for candidates for the A. B. degree. Prerequisite, Plane Trigonometry. Students preparing to teach Physics are advised to take this course. The work is divided as in Course A. Experimental lectures and recitations, 3 hours; laboratory work, two periods of 2 hours each (counts 4 hours).

H. *General Physics* for candidates for the S. B. degree. Similar to Course B, except that the experiments are selected especially for engineering students. 4 hours.

G. *Problem Work.*—Open to students who have taken or are taking Course A, B, or H, and recommended especially to those preparing to teach Physics. 1 or 2 hours.

C. *Advanced Physics.*—Prerequisite, Course A or B and Plane Trigonometry. *Electricity and Magnetism.* 2 hours. Omitted in 1908-09.

D. *Advanced Physics.*—Prerequisite, Course A or B and Plane Trigonometry. *Light,* including geometrical and physical Optics; and *Theory of Heat.* 2 hours. Courses C and D are given in alternate years. Students electing these courses are advised to elect also at least one hour in Course E.

E. *Practical Physics.*—Prerequisite, Course A or B.

Experiments in Mechanics.—Study of the balance; Borda, Kater and Foucault Pendulums; elastic modulus by various methods; viscosity of liquids, soap films and Plateau figures; comparison of scales by comparator; hydrostatic pressures.

Experiments in Heat.—Calibration of thermometers by double points of H_2O and of other compounds; heat-equivalents of liquefaction and vaporization; relation of viscosity to temperature.

Experiments in Sound.—Vibration of wires; longitudinal waves; resonance of forks and air columns; Lissajous' and Melde's experiments.

Experiments in Optics.—Measurements of constants of mirrors; cardinal points of lenses; photometric measurements with Bunsen and Lummer-Brodhun photometers; study of the eye and its defects; study of diffraction patterns; spectrometer and interferometer work.

Experiments in Electricity and Magnetism.—Study of the Earth's field; temperature variations of magnets; wireless signals; X-ray work with the static machine, induction coil and Tesla coil; electrodynamic laws.

The credit in any of these subjects will depend upon the time spent in the laboratory, 2 hours a week counting as 1 hour.

F. *Advanced Theoretical Physics.*—Prerequisite, Course C. *Theory of Electricity and Magnetism* based on a study of J. J. Thomson's Elements of Electricity and Magnetism. 2 hours.

K. *Precise Measurements in Electricity and Magnetism.*—Prerequisite, Course B or H, and a knowledge of the calculus. I, E, and Q constants of galvanometers. Value of H of Earth's field. H, B curves for iron. Hysteresis loop, Comparison of E. M. F.'s, Measurement of Resistance, Capacity and Inductance. 4 hours' laboratory work a week. 2 hours.

NOTE.—In all laboratory courses a fee of $2.00 is charged for each credit of one hour for a half-year. In Courses A, B and H there is a laboratory-book fee of 25c each half-year.

CHEMISTRY.

PROFESSOR STRIEBY, PROFESSOR GRISWOLD AND MR. STEWART.

A. *Elementary Chemistry.*—Text-book work (chiefly Inorganic Chemistry) supplemented by lectures and discussions upon the fundamental laws, the application of chemistry to sanitary science, medicine and some of the arts, and also by occasional papers from descriptions in technical books, and by reports of visits to metallurgical and manufacturing establishments. Remsen's *College Chemistry.* 3 hours' recitation and 4 hours' laboratory work (counts 3 hours).

B. *Advanced Chemistry.*—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. 3 hours' recitation or lectures and 4 hours of laboratory work (counts 3 hours).

C. *Qualitative Analysis.*—Prerequisite, Chemistry A or equivalent. Experimental drill in obtaining characteristic reactions of the more common elements, study of empirical formulæ and symbolic expression of reactions, solution of substances, separation of groups of elements, and finally analysis—first of simple salts and later of complex mixtures. The analytical work is confined almost wholly to inorganic substances, but includes certain common organic acids and a few organic bodies of general and medicinal use. 9 hours (counts 4).

D. *Quantitative Analysis.*—Prerequisite, Chemistry C. The laboratory work comprises determinations of single elements by approved methods, gravimetric and volumetric, followed by the analysis of selected salts, ores, slags, mineral water and commercial products. A few rapid or commercial determinations are given as the final work. The lectures treat of the methods of analysis, properties of precipitates, stoichiometry, sampling, reporting and the theory of solutions. The laboratory work occupies 3 consecutive hours 4 days a week (counts 4 hours). Cairn's *Quantitative Analysis.*

E. *Organic Chemistry.*—Prerequisite, Chemistry A or B. Remsen's *Organic Chemistry.* Lectures and discussions of special subjects and processes. 3 hours' recitation and 3 hours' laboratory work (counts 3 hours).

F. *Theoretical Chemistry.*—Prerequisite, Chemistry B. Text-book work with lectures and oral and written discussions. 3 hours.

G. *Medical Chemistry.*—Prerequisite, Chemistry B. Lectures, text-book, assigned reading and laboratory work. The study is mainly of substances, inorganic and organic, that are of importance in medical science and hygiene. Especial attention is devoted to the analysis of urine, water, milk, metallic poisons, and the use of disinfectants. The needful gravimetric determinations, considerable volumetric work with burettes and standard solutions, and microscopic and spectroscopic tests, supplement the usual qualitative examinations. 4 hours' recitation, 4 hours' laboratory work (counts 4 hours).

H. *Agricultural Chemistry.*—Prerequisite, Chemistry B. A study of soils, fertilizers, foods and feeding; the analysis of soils, manures, water and dairy products. 3 hours.

The fee for every course must be paid in advance. It covers the cost of gas, chemicals and non-returnable supplies, except platinum. Glassware and necessary apparatus (except platinum vessels) are loaned to the student and must be returned in good condition.

The fees are as follows:

Course A	$7.00
Course B	8.00
Course C or D, each year's work	15.00
Course E or G	15.00

BIOLOGY.

PROFESSOR SCHNEIDER, MR. SCLATER AND MISS GILBERT.

A. *General Biology.*—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution.

First half-year: *Plant Studies.*—In the laboratory a comparative study is made of the cryptogams, beginning with the simplest forms. This is followed by a study of the structure of typical flowering plants.

Second half-year: *Animal Studies.*—The laboratory work involves a study of representatives of the principal groups of animals.

Recitations or lectures, 2 hours; laboratory work, 4 hours (counts 3 hours).

B. *Zoology.*—Prerequisite, Biology A. Lectures and recitations on the History of Zoology, Systematic Zoology, Morphology, and Embryology. Dissection of various classes and orders of animals up to chordata, with careful microscopic study of the finer structures. Recitations, 2 hours; laboratory work, 4 hours (counts 3 hours).

C(1). *Physiology and Personal Hygiene.*—Prerequisite, Biology A. Lectures, recitations and practical work by the student. The experimental work covers the following subjects: The physiology of ciliary motion; the general physiology of muscle and nerve tissue; phenomena of circulation, with countings of the blood-corpuscles and estimation of hæmoglobin; respiratory exchanges, movements, etc; digestion and absorption; physiology of the spinal cord and brain; of the cutaneous sensations, taste, smell, hearing and vision. Some time is also given to lectures, with demonstrations, on the physiological action of the more important poisons. Recitations or lectures, 3 hours; laboratory work, 2 hours (counts 3 hours).

C(2). *Physiology.*—Prerequisites, Biology A and Chemistry B. This course is adapted to the needs of the premedical student. Recitations or lectures, 3 hours; laboratory work, 5 hours (counts 4 hours).

D.* *Comparative Anatomy of Vertebrates.*—Prerequisite, Biology A. Careful dissection of the Amphioxus, Cyclostome, Fish, Amphibian, Reptile and Bird. Lectures, collateral reading, and recitations. First half-year, 6 hours (counts 3 hours).

E.* *Mammalian Anatomy.*—Prerequisite, Biology A. The work is based upon a detailed dissection of the cat. Other material is used to illustrate the anatomy of special organs. Lectures and collateral reading. Second half-year, 6 hours (counts 3 hours).

F.† *Histology.*—Prerequisite, Biology A. A comparative detailed study of the tissues of the higher animals. Preparations of the principal tissues and organs are made and the common methods of preparation and mounting studied. Special microscopic drill is given in distinguishing the different tissues and organs. First half-year, 6 hours (counts 3 hours).

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* Courses D, E and H will be offered in 1908-09 and alternate years.

† Courses F, G and J will be offered in 1909-10 and alternate years.

G.† *Embryology and Cytology.*—Prerequisite, Biology F. A study of maturation, fertilization and cleavage of the ovum, early stages of the embryology of the chick and frog. Special attention is given to the differentiation and development of tissues and organs. Students make most of their own preparations. Second half-year, 6 hours (counts 3 hours).

H.* *Bacteriology.*—Prerequisite, Biology A. Apparatus; culture media and methods of preparation; sterilization methods; microscopic characteristics of cultures of bacteria in general and of special forms and methods of diagnosis; methods of obtaining pure cultures; methods of staining; bacteriological investigations of water, air, and soil. Students electing this course are expected to take Biology I. 5 hours (counts 2 hours).

I. *Sanitary Science and Public Health.*—A lecture course. Some of the topics discussed are: Death and its causes; classification of diseases; ancient and modern theories of disease; germ theory of infectious disease; direct causes and predisposing causes of disease; means of avoiding and resisting disease; vehicles of disease, such as dust, sewage, water, etc.; brief sketch of the important transmissible and epidemic diseases, prophylaxis, etc. 1 hour.

J.† *Plant Physiology.*—Prerequisites, Biology A and one year of Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First half-year, 5 hours (counts 2 hours).

K. *Systematic Botany — Seed Plants.* — Prerequisite, Biology A Lectures on the principles of classification. A study of local flora is made, including the collection and determination of flowering plants. Some time is devoted to a study of the

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* Courses D, E and H will be offered in 1908-09 and alternate years.

† Course F, G and J will be offered in 1909-10 and alternate years.

structural adaptations of plants to their surroundings. Second half-year, 3 hours.

Laboratory Fees: Course A, $2.50; Course B, $4.00; Course C(1), D, F, G or J, $3.00; Course E or K, $2.00; Course C(2) or H, $6.00.

GEOLOGY.

Professor Finlay.

A. *General Geology.* — Prerequisite, Elementary Chemistry. Dynamical, Structural and Historical Geology. Lectures, laboratory work Tuesday and Thursday afternoons, and field excursions on Saturday mornings. The student, while not required to do so, is advised to elect Mineralogy and Zoology before taking Geology, or at the same time with it. Texts: Chamberlin and Salisbury's *Geology,* Scott's *Introduction to Geology.* 3 hours.

B. *Mineralogy.*—Prerequisite, Elementary Chemistry. Required for Courses E and H. The economic or ore classification of minerals is used and the time is devoted chiefly to laboratory work in Descriptive and Determinative Mineralogy. Text: Moses and Parson's *Mineralogy, Crystallography and Blowpipe Analysis.* Laboratory fee, $3.00. Uniform individual working outfits are furnished at cost. 6 hours (counts 3 hours).

E. *Economic Geology.*—Prerequisites, Courses A and B. Lectures and required reading. The geology and mineralogy of the ore deposits of the United States, gold, silver, copper, lead, zinc, iron. The greater part of the second half-year is devoted to the consideration of coal, building stones, and the less important non-metallic minerals. In the spring there are voluntary field excursions to mining localities. Texts: Kemp's *Ore Deposits of the United States and Canada,* Kemp's *Economic Geology of the Non-metallic Minerals.* 3 hours.

F. *Invertebrate Paleontology.*—Lectures and laboratory work. Systematic study of the chief classes of the invertebrates by means of fossils, with special attention to the structure and development of the trilobites and brachiopods. Collections are made in the field to afford training in the identification of geological horizons. First half-year, 3 hours. Given in 1908-09 and alternate years.

G. *Vertebrate Paleontology.*—Lectures, laboratory work on the museum collections and required reading on the main lines of mammalian descent from the Eocene to recent time. First half-year, 3 hours. Given in alternate years; omitted in 1908-09.

H. *Petrography.*—Prerequisites, Courses A and B. Lectures and laboratory work with the microscope on the commoner rock-forming minerals and the principal rock types. Second half-year, 3 hours.

I. *Field Geology.*—The systematic investigation in the field of 150 square miles immediately adjacent to Colorado Springs with the preparation of maps and a report. Individual work under the guidance of the instructor.

BIBLE STUDY.

Professor Parsons and Assistant Professor Smith.

A. *Biblical Introduction.*—An information course in the contents and the general historical and literary setting of the books of the Bible. 1 hour.

B. *The History and Literature of the Hebrew People: Pre-exilic.* Not open to Freshmen. 2 hours.

C. *The History and Literature of the Hebrew People: Post-exilic.* Prerequisite, Course B. 2 hours.

D. *New Testament Introduction.*—Not open to Freshmen. 1 hour.

E. *The Life of Christ.*—2 years, 1 hour.

F. *The Life of Paul.*—1 hour. Not given in 1907-09.

NOTE.—For a course in New Testament Greek, see Greek I.

PHYSICAL EDUCATION.

MISS WOODSMALL.

A. *Physical Education.*—Required for all young women. This course includes methods and theory of physical training. During the first half-year one hour is given to first aid to the injured, including bandaging, wounds, burns, fainting, etc. Members of the class are given experience in practice teaching in the gymnasium. 2 hours.

MUSIC.

For courses in Music see pp. 106, 107. Course A only is counted towards a degree. Courses in Music are not included in the regular tuition fee.

Students of Music register with the Dean of the School of Music.

Honors and Scholarships Awarded at Commencement, 1907

High Honors.

Jean Muriel Auld, 1908.
Mabel Sylinda Bateman, 1907.
Albert R. Ellingwood, 1910.
Carl Arthur Hedblom, 1907.
Ida Margaret Johnson, 1909.
John McArthur Maguire, 1909.
Anna H. Strang, 1910.

Honors.

Elsie M. Elrick, 1910.
Ruth H. Frothingham, 1908.
Rhoda Haynes, 1908.
Julia D. Ingersoll, 1910.
Ethel C. Norton, 1909.
Harold D. Roberts, 1908.
Marie A. Sahm, 1907.
Montgomery R. Smith, 1907.
Laura V. Tanner, 1907.

Perkins Scholars.

Ida Margaret Johnson, 1909.
John MacArthur Maguire, 1908.

Mary G. Slocum Scholar.

Harold De Witt Roberts, 1908.

Minerva Scholar.

Margaret Mack, 1908.

The Master's Degree

The Master's degree is conferred subject to the following conditions:

(1) The applicant must have received the Bachelor's degree from some reputable college or university.

(2) The applicant must pursue in residence a minimum course of nine hours of advanced work a week for one year. The work shall include both a major and a minor subject, and at least five hours a week shall be taken in the major subject. In addition, the applicant must present a dissertation that embodies the result of a careful investigation, such dissertation to represent the equivalent of at least three hours of lectures a week for one year. The dissertation must be approved by the heads of the departments in which the major and minor subjects are taken, before the applicant is permitted to present himself for the final examination. The dissertation must be handed in not later than May 15. It must be typewritten on paper of a prescribed size, and a copy deposited with the College librarian.

(3) The final examination shall be oral and public, and it shall be in the presence of the professors of the major and minor subjects and of a third professor. In the examination the applicant must give evidence not only that he has done satisfactorily the minimum requirements, as stated above, but also that he has a satisfactory knowledge of the general fields within which the major and minor subjects lie.

The latest date of registration for post-graduate students is October 15.

The fees are $50 a year for tuition, $5 for the diploma, and $1 to bind the thesis.

Applications for the Master's degree should be sent to the Chairman of the Faculty Committee on Post-Graduate Degrees, who will furnish information about courses.

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* The practice of allowing students to enter upon studies *in absentia,* as candidates for a Master's degree, has been discontinued.

School of Engineering

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D. (Amherst).

President.

FLORIAN CAJORI, Ph. D. (Tulane).

Dean and Head Professor of Mathematics.

J. ROY ARMSTRONG, E. E., B. S. (Armour Institute of Technology).

Professor of Electrical Engineering.

CHARLES G. COLLAIS, M. E.

Superintendent of Mechanical Laboratories.

GEORGE IRVING FINLAY, Ph. D. (Columbia).

Professor of Geology, Mineralogy and Paleontology.

CLYDE L. GRISWOLD, E. M. (Columbia).

Professor of Mining and Metallurgy.

ELIJAH CLARENCE HILLS, Ph. D. (Colorado).

Head Professor of the Romance Languages and Literatures.

GEORGE M. HOWE, Ph. D. (Cornell).

Professor of Germanic Languages and Literatures.

GEORGE J. LYON, C. E. (Columbia).

Professor of Civil Engineering.

HOWARD MOORE, C. E. (Princeton).

Assistant Professor of Graphics.

CHARLES W. D. PARSONS, A. B. (Cornell).

Professor of Physics.

SIDNEY F. PATTISON, A. B. (Williams).

Professor of English.

WILLIAM STRIEBY, A. M., E. M. (Columbia).

Professor of Chemistry and Metallurgy.

ORGANIZATION OF THE SCHOOL.

The present rapid development of Colorado and the West created so imperative a demand for instruction in pure and applied science that in 1902 the Trustees of Colorado College decided to add to its existing departments a School of Engineering. Colorado Springs is admirably situated for such a school. The suburban electric railway takes the student to three different plants for the reduction of ore; the mines of Cripple Creek and the metallurgical works of Pueblo are near by; there are in the neighborhood fine examples of mountain railway construction and large electric plants with machinery of modern type. The Hydro-Electric Company has now completed its power plant near Manitou, in utilization of a head of water the highest ever developed in hydraulic engineering. By careful study of local engineering problems and by close contact with the engineering establishments of this vicinity, it will be possible to secure a thorough blending of theoretical and practical instruction.

REQUIREMENTS FOR ADMISSION.
(16 units.)

The requirements for admission to the engineering courses are as follows:

1. Mathematics (3 units)—(*a.*) Algebra through simultaneous quadratic equations; (*b.*) Elementary Plane Geometry; (*c.*) Solid and Spherical Geometry; (*d.*) Review Algebra, Ratio and Proportion, Binomial Theorem, Arithmetical and Geometrical Progressions, Elements of Permutations and Combinations. Plane Trigonometry is desirable, but not necessary. A thorough preparation is of great importance.

2. Physics (1 unit)—One year's course. See p. 24.

3. Chemistry (1 unit)—One year's course. See p. 24.

4. Biology (1 unit)—One year's course. In place of Biology may be substituted an equivalent amount of Botany, Physiology, Physiography, or Geology, any two of these to be counted the equivalent of Biology. See p. 24.

5. English (3 units)—As in the College. See p. 20.

6. Foreign Languages (2 units)—Two years. See pp. 22, 23.

7. American, and English or Ancient History (2 units)—One year's course in each. See p. 21.

8. Electives (3 units)—Preferably in modern languages. See p. 22.

DEGREE.

At the completion of an engineering course the student will receive the degree of Bachelor of Science, with a specific designation of the engineering course taken.

THESIS.

Each student is required to present, before graduation, a thesis on some engineering subject embodying investigations of his own.

SUMMER MEMOIR.

At the beginning of each of the last two years, a description of some engineering work, containing from three to five thousand words, is required of each student.

THE COLORADO POLYTECHNIC SOCIETY.

The Colorado Polytechnic Society, organized in 1904, has a large membership, composed of engineers of the Pike's Peak region. Its meetings are held in the Coburn Library, and the members have access to the engineering library of the College. Students of the School of Engineering are associate members of the society, and at its meetings enjoy the privilege of personal contact with prominent engineers.

ENGINEERING LIBRARY.

Since the opening of the Engineering School, much has been done in the accumulation of a library of technology. The first

acquisition consisted of the private library of the late Professor R. S. Miller, of Purdue University, which is particularly strong along the lines of mechanical engineering. A large number of new engineering books has been purchased, and a number of technical journals secured. Of the latter, the following are now at hand: A complete set of The Engineering Record (formerly called The Sanitary Engineer), of The Mineral Industry, of Van Nostrand's Engineering Magazine, and The Scientific American; a nearly complete set of The Scientific American Supplement; ninety-five volumes of the Minutes of the Institution of Civil Engineers of Great Britain, and the recent volumes of the Engineering Magazine, Cassier's Magazine, Engineering News, Engineering and Mining Journal, Electrical World, Electrical Engineer, Electrical World and Engineer, Electrician (London), Technology Quarterly, Municipal Engineering, American Machinist, Journal of the Franklin Institute; the current numbers of Ores and Metals, Mining Industry, Chemical News, Journal of the American Chemical Society and Fresenius Zeitschrift; the recent transactions of the American Institute of Mining Engineers, the American Institute of Electrical Engineers, the American Society of Civil Engineers, the American Society of Mechanical Engineers. The library has also the reports of the (Colorado) State Engineer, the United States Geological Survey, the United States Coast Survey, the Chief of Engineers and the Chief of Ordnance, U. S. Army, as well as the United States Publications on Irrigation. In addition, over twenty other engineering journals, taken by the Colorado Polytechnic Society, are at the disposal of the faculty and engineering students. Some important engineering books and journals have been received as donations. Captain L. E. Berthoud of Golden, Henry Hine and George C. Hewitt, of Colorado Springs, gave several volumes; Mr. M. Kirkman, of Chicago, gave a set of his "Science of Railways"; Mr. John Herron of Telluride, gave fourteen volumes of the Transactions of the American Society of Civil Engineers and six volumes of the Journal of the Association of Engineering Societies. Mr. B. H. Bryant has loaned the Engineering School and the Colorado Polytechnic Society, twenty-six volumes of the Engineering News, twelve volumes of the Railroad Gazette and other publications, amounting to over one hundred volumes. Mrs. Walter B. Wilson donated Hayden's Atlas and other works. From

the Armour Institute the library received a complete set of Modern Engineering Practice.

LABORATORIES AND EQUIPMENT.

The Physical Laboratory. See p. 113.

The Chemical Laboratory. See p. 114.

The Mechanical Laboratories.—In addition to the training of hand and eye necessary for his future studies in drawing and design, it is desirable that every engineering student should acquire practical knowledge of carpentry, wood turning, pattern-making, blacksmithing, tool-making, machinists' bench and vise work, and the handling of machine tools. Such practical knowledge is an essential to the engineer in forming his judgments on the details and the possible execution of his designs in the shop. To afford training along these lines, as well as to give the student a foundation for further work along the lines of structural engineering, three laboratories containing machinery of the latest and most approved patterns have been established. All of these laboratories are well lighted and have steam heat and electric lights. Each is planned with a view of illustrating the best engineering practice in its particular line.

1. *Wood Laboratory.*—The Wood Laboratory occupies a room, 30x60 ft., and has electrical drives. It is equipped with heavy maple-top cabinet benches, each having a tool cabinet furnished with the best make of tools, comprising Bailey planes, Buck Brothers' chisels, Disston saws, etc. Six wood-turning lathes of 14-inch swing have been added recently to the equipment of the pattern-making department, making in all twelve lathes for this work. The laboratory has also a 32-inch band saw, a table saw, 24-inch cylinder planer, hand saws, planes, clamps, hand screws and tool-sharpening machinery.

2. *Forging Laboratory.*—This laboratory occupies a room 30x 30 ft., with a stock room 10x15 ft. adjoining. A twenty-horsepower General Electric variable speed motor furnishes power. This motor drives Sturtevant blast and suction fans connected with Buffalo iron blast forges. The equipment consists of swage blocks, benches, vises, lockers, etc.

3. *Iron Laboratory.*—The machine laboratory occupies a top-lighted room 25x100 ft., in the enlarged shop building. A steam engine is used in this laboratory, both to drive the equipment and to serve as an illustrative piece of apparatus. The equipment of this laboratory consists of machinists' benches, bulldog vises, and drawers containing individual sets of tools; with two Bradford engine lathes, an E. E. Ried screw-cutting lathe, Hendey-Norton 14-inch precise tool room lathe, a shaper, a Cincinnati universal milling machine with various attachments including a dividing head; a Greenfield universal tool and cutter grinder, adapted for grinding to size straight, and taper arbors, conical or cylindrical work, internal sizing, reamers of various kinds, milling cutters, taps and dies, countersinks and counterbores, etc.; a large and a small drillpress, an emery grinder, a machine hacksaw, and grinding machinery. Several different kinds of micrometers, face plate for finishing surfaces, and large steel machinists' rules, etc., are useful in advanced work. As need arises other equipment will be added to this and the other mechanical laboratories.

The Testing Laboratory.—A room in the recently completed shop building has been assigned for the testing of materials of construction. Here is mounted a 100,000-pound Riehle testing machine for making tension, compression, shearing and transverse tests and an abrasion cylinder for testing paving material. Power is furnished to both machines from a five-horsepower Crocker-Wheeler motor. In addition to other accessory apparatus a Henning extensometer is available for tension

tests and an Olsen compression micrometer for compression tests. Each of these instruments reads to one ten-thousandth of an inch. Each student is required to make a series of tests upon the resisting properties of wood, brick, concrete, stone, wrought iron, cast iron and steel. Commercial tests, made from time to time for local manufacturers and others, bring the students into close touch with practical work of this sort.

The Cement Testing Laboratory in the basement of Cutler Hall is equipped with a Fairbanks testing machine, sand and cement sieves, briquette moulds, cube moulds, Gilmore's needles, and running water as well as the necessary storage tanks and other apparatus requisite for investigations in the nature and physical properties of cement and cement mortars. All students are required to make and test briquettes of cement and cement mortar, as well as to determine the weight, fineness and other physical properties of such cement, sand, and mortar as may be assigned to them for examination.

The Hydraulic Laboratory is in the basement of Cutler Hall. It has a floor space of 2,000 square feet, and is furnished with an ample supply of water. It is equipped with a calibrated tank of 1,500 gallons capacity, weirs of different shapes and sizes, and with a variety of orifices for the purpose of determining hydraulic constants; with apparatus for experiments in connection with the flow of water through pipes; with a Venturi meter and a series of displacement meters including one each of the piston, rotary and disc types; with pressure guages, differential guages, thermometers, etc., as well as with the portable tanks and scales usually found in such laboratories. To illustrate the principles of water motors there are a twelve-inch Doble impulse wheel designed especially for laboratory purposes, made with an adjustable nozzle, and furnished with a glass casing instead of the usual metal one, so that the action of the jet may be seen, a small centrifugal pump, and a nine-inch Seffel turbine in a cast iron globe case.

The Assay Laboratory is equipped with twenty-two muffle furnaces for solid fuel, and crucible and muffle furnaces for gasoline; also a large furnace of reverberatory type for handling a large

number of fusions at one time; ore bins, fuel bins, two power crushers, steel sampling floor and table; twelve new pulp balances and several button balances, including two of the highest grade made by Ainsworth, of Denver. It is also supplied with a large number of checked ore samples of various grades and kinds, many of them donated by the American Smelting and Refining Company, the Ohio and Colorado Smelting and Refining Company, the United States Reduction and Refining Company, the Portland Mining and Milling Company, the Elkton Mining Company, Mr. E. C. Woodward and others.

The Mining (Ore-Dressing) Laboratory has been reinstalled in more suitable quarters. The apparatus, consisting of a Dodge crusher, crushing rolls, bucket elevator, King screen, jig, hydraulic classifier, Wilfley table, Morris centrifugal pump and storage tank, has been so arranged that a continuous test run can be made. The sample taken from the ore to be tested is passed to the sample grinder; after quartering on the floor plates, it is further reduced by passing through a Braun's automatic sampler, thus insuring accurate data at the beginning of the test.

The Metallurgical Laboratory equipment includes a reverberatory furnace for roasting and smelting, a set of iron kettles for desilvering base bullion, a chlorination barrel, tanks for cyanide and lixiviation tests of gold and silver ores, a grinding and amalgamation pan, apparatus for microscopical study of metals, furnaces for experiments in fusibility and heat treatment, Fery radiation pyrometer, Le Chatelier pyrometers (platinum-rhodioplatinum couple and copper-constantan couple) a twenty-four hour recording pyrometer, and a calorimeter.

The Electrical Laboratory.—Besides the apparatus in the Physical Laboratory proper, the School has the following equipment for electrical engineering: Two 100,000-ohm, high-resistance boxes (German make); two 5,000-ohm, high current capacity boxes (German make); Western Union test set, portable test set, Model K test set, Whitney test set, Queen test set, four box bridges.

Fifteen Galvanometers as follows: Two Rowland D'Arsonval, four Wall D'Arsonval, three ballistic, eight-coil astatic, four-coil Green astatic, two Thomson controlling magnetic and two Weston milli-volt type.

Various instruments as follows:

One dial faradmeter, a universal ohm and faradmeter, Beggew electrometer, W. & G. quadrant electrometer, three Ayrton universal shunt boxes, Queen universal shunt box, Hopkinson's yoke permeameter, permeameter test set complete (from H. & B. Co., Germany), student magnetometer, Kohlrausch bridge, Rowland magnetizing ring, two fixed standards of self-induction, bridge for determining small inductances, standard of induction with secondary, resistance thermometer, Boise magnetic balance, three-meter optical bench, Lummer-Brodhun screen, secohmmeter, four electro-dynamometers, wattmeter dynamometer, four torsional voltmeters and volt boxes, a Kelvin conductivity bridge, and a Willyoung potentiometer.

Direct Current Instruments: Cardew hot-wire voltmeter, three Weston voltmeters, Weston standard laboratory voltmeter, Weston milli-voltmeter, Weston volt-ammeter, four Weston ammeters, Weston milammeter, two Weston wattmeters, four General Electric ammeters, four General Electric voltmeters, two Westinghouse ammeters, Duncan indicating 2- and 3-wire wattmeter, Diamond indicating wattmeter, two Schallenberger wattmeters, Sangamo wattmeter, Federal wattmeter, Thompson-Rice arc ammeter, National potential indicator, stand ammeter, Edison (old solenoid) ammeter, Westinghouse compensator, Thompson-Houston ground detector, General Electric ground detector, Westinghouse ground detector, and a speed tachometer with voltmeter.

Alternating Current Instruments: Weston voltmeter, Weston ammeter, three Thompson inclined-coil wattmeters, six Thompson inclined-coil voltmeters, eight Thompson inclined-coil ammeters, two Westinghouse ammeters, two Westinghouse voltmeters, two Westinghouse power-factor meters, a Westinghouse frequency meter, two Westinghouse polyphase

indicating wattmeters, a Westinghouse polyphase graphic recording wattmeter, a single-phase Westinghouse synchroscope, Sangamo wattmeter, Duncan wattmeter and a wave-form meter.

Direct current dynamos are represented by two 15 k. w. General Electric direct-connected 110 volt generators, one 30 k. w. General Electric direct-connected 110 volt generator, one 50 k. w. General Electric direct-connected 110 volt generator, one 2 k. w. La Roche exciter generator, one 10 k. w Fidelity generator, one ½ h. p. H. J. Evans special D. C. generator for illustration in the lecture room.

The first four generators are connected with a switchboard for two or three wire systems, allowing single or parallel operation.

Direct current motors are represented by two 15 h. p. Sprague street car motors, one 14 pole Ft. Wayne, one Excelsior arc-motor, one small Westinghouse, one 2 h. p. 52 volt Emerson, one 12 h. p. Lundell, one 5 h. p. Crocker-Wheeler, one 10 h. p. General Electric variable speed shunt field control, one 15 h. p. General Electric, one 25 h. p. variable speed General Electric armature control, one 20 h. p. Westinghouse compound variable speed with a machine tool controller, and one 15 h. p. Thompson-Houston (old type) motor.

Alternating current machinery is represented by a La Roche special alternator, one and two phase, 125 cycles, 25 k. w., 2000 volts or 60 cycles, 15 k. w., 1000 volts (the armature is composed of two parts such that a mechanical displacement of phase from 0° to 90° may be obtained), an A. C. Wagner motor, two Emerson motors, one G. E. motor, 1½ k. w. Maloney transformer, one Stanley transformer, one 50 k. w. high-tension transformer, giving a range up to 80,000 volts; two Type H General Electric transformers, one ½ h. p. H. J. Evans special alternator for lecture illustration, two General Electric combination alternators, giving 1, 2, 3 or 6 phase operation. These two machines are connected to a 3-phase Westinghouse blue Vermont marble switchboard, allowing the

study of single and parallel operation and synchronizing of 3-phase machines.

The dynamo laboratories also contain circuit breakers, lamp banks for loading machines, oil switches of different sizes, complete lines of Thomas, Locke and General Electric porcelain insulators, an assortment of Hemengray glass goods, parts of Weston instruments showing their construction, an exhibit of General Electric incandescent lamps, showing the steps in the process of manufacture, collections fuses from Johns-Manville and D. & W. Fuse Co., field rheostats, starting boxes and quick break switches.

The Photometric Laboratory is equipped with a three-meter photometer bench and Lummer-Brodhun screen. Measurements of horizontal and spherical candle power, as well as comparisons of lamps with standard lamps, can be made.

The Calibration Laboratory is equipped with the necessary apparatus for accurately calibrating instruments of all kinds under various conditions of current voltage and power factor of alternating current.

The Experimental Engineering Laboratory has one horizontal and three vertical steam engines, four boilers, boiler feed pumps, auxiliary apparatus of the power plant, ventilating fans, hoisting blocks, etc., for making various commercial mechanical tests, such as boiler pressure tests, efficiency tests of all kinds, steam indicator diagrams and valve settings of engines.

Surveying—The School possesses a good working equipment of engineers' field instruments, including four plain transits, a complete Berger mining transit with interchangeable top and side telescope, a Saegmuller mining transit with solar attachment, a Young and Sons mining transit with top telescope and Smith solar, a Buff and Buff triangulation transit of the U. S. Coast and Geodetic Survey pattern, a surveyor's compass, a Burt solar compass, two wye levels, a plane table with telescopic alidade, a traverse table, a U. S. Navy pattern sextant, as well as smaller instruments and accessories. Each student

is required to learn the use and adjustment of the field instruments.

Lantern Slides and Photographs and Trade Catalogues—The School has a representative collection of lantern slides on steam engineering, machine design, metallurgy and electrical engineering, and blue prints and photographs of various engineering structures. The department drafting rooms contain complete reference files of catalogues and blue prints pertaining to their special engineering branches. These are consulted and freely used in connection with those courses requiring design work.

Geometrical Models—For illustrating subjects in Descriptive Geometry and Graphics there are in the Drafting Room a number of models prepared by students. The collection includes half a dozen thread models of ruled surfaces, bridge trusses and machines. In the mathematical class-room there are a number of models of wood and of plaster of Paris.

Courses

MINING ENGINEERING.

The course in mining engineering is designed to give a thorough grounding in the theoretical principles upon which the successful practice of mining and metallurgy must rest, to create in the student the habit of investigation, and to familiarize him with current and past practice, especially that in successful up-to-date plants. With this in view there are included, in addition to the courses in mining, metallurgy and geology, thorough courses in mathematics, physics, chemistry, theoretical and applied mechanics, and briefer courses in steam and electrical engineering, surveying and mining law. In order that theory may go hand in hand with practice the students in this course are aided and encouraged to work during the summer vacations at representative mining and metallurgical plants and are required to hand in a detailed memoir covering the work in which they have engaged. The instruction in the course is illustrated by models, charts and diagrams, and also by visits to near-by plants, where the processes in use are fully explained, working sketches of the plant and machinery are made, and criticisms of the methods employed are suggested. For this the school is admirably situated, as three modern reduction works, employing as many different processes, are within a half hour's ride, and within easy reaching distance are the mines and mills of the Cripple Creek district. Before graduation, the students are required to hand in a thesis embodying a detailed investigation into some metallurgical or mining problem, usually one of present importance in the industry. The ability to do original work, thus acquired, is of the greatest value.

FRESHMAN YEAR.

First-Half Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Algebra (Math. A1) p. 52....	4	Trigonometry (Math. A3) p. 52.....	4
Advanced Chemistry (Chem. B) p. 56.....	7		

FRESHMAN YEAR—*Continued.*

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Drawing (Graphics A)	6	Descriptive Geometry (Graphics B)	8
Woodwork (Shopwork A)	6	Advanced Chemistry (Chem. B) p. 56	7
Rhetoric and Composition (English B) p. 35	3	Elem. Surveying (Civil Eng. A)	8
Modern Language	3	Rhetoric and Comp. (Eng. B)	3
Descriptive Geometry (Graphics B)	1	Modern Language	3

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	3	Analytical Geometry (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Qualitative Analysis (Chem. C)	9	Quantitative Analysis (Chem. D)	9
Gen. Physics (Phy. H)	7	Gen. Physics (Phy. H)	7
Mineralogy (Geol. B)	6	Mineralogy (Geol. B)	6
Machine Design (Graphics C)	4	Modern Language	2
Modern Language	2	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Mechanics (Math. J)	4	Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3	Resistance of Materials (Civ. Eng. B)	2
General Geology (Geol. A)	3	Testing Laboratory (Civ. Eng. T)	3
Quant. Anal. (Chem. D)	12	General Geol. (Geol. A)	3
Surveying (C. E. V and W)	5	Assaying (Met. A)	9
Masonry (C. E. M.)	2	General Metallurgy (Met. B)	1
Power Plants (Elect. Eng. Q)	2	Met. of Copper (Met. C)	3
		Mining A	3
		Power Plants (Elect. Eng. Q)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.	Hours per week.
Economic Geology (Geol. E)	3
Hydraulics (Civ. Eng. H)	2
Ore Dressing (Mining C)	3
Mining B	2
Electrical Machinery (Elect. Eng. P)	2
Met. of Lead (Met. D)	2
Met. of Gold (Met. E)	2
Met. of Silver (Met. F)	1
Mining Law	1
Mine Plant Design (Min. E)	2

Second Half-Year.	Hours per week.
Economic Geology (Geol. E)	3
Petrography (Geol. H)	6
Mine Plant and Equipment (Mining D)	3
Electrical Machinery (Elect. Eng. P)	2
Met. of Iron and Steel (Met. G)	2
Mining Laboratory (Mining G) afternoons for 3 weeks.	
Met. Laboratory (Met. H) afternoons for 3 weeks.	
Mine Administration (Mining F)	1
Thesis.	

CIVIL ENGINEERING.

The four years' course leading to the degree of Bachelor of Science in Civil Engineering is designed to afford a thorough analytical training as well as numerous and extended practical exercises in those matters that pertain to the profession of the civil engineer, including all kinds of structures and public works, and also the various developments and applications of power by the use of electric, steam, water and air motors.

The theoretical portion of the instruction is based largely upon the courses given in the departments of mathematics and physics, and the results obtained are applied to practical engineering work. Special stress is laid upon the design by the student of the various structures and machines which the civil engineer is called upon to construct in the practice of his profession.

The instruction is given by lectures, demonstrations by the student, and frequent conferences, co-ordinate with which the work of design is carried on. It covers comprehensively the subjects

of surveying, water supplies of cities and towns, irrigation, sanitary engineering, including sewage disposal, graphic and analytic treatment of all metallic structures, foundations, retaining and reservoir walls, high masonry dams, sewer systems, hydraulic engineering, rivers and harbors, hydraulic, steam and electric motors.

FRESHMAN YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Algebra (Math. A1) p. 52	4	Trigonometry (Math. A3) p. 52	4
Advanced Chemistry (Chem. B) p. 56	7	Advanced Chemistry (Chem. B) p. 56	7
Mechanical Drawing (Graphics A)	6	Descriptive Geometry (Graphics B)	8
Workshop (Shopwork A)	6	Plane Surveying (Civil Eng. A)	8
Rhetoric and Composition (English B) p. 35	3	Rhetoric and Composition (English B)	3
Modern Language	3	Modern Language	3
Descriptive Geometry (Graphics B)	1		

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	2	Analytical Geom. (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
General Physics (Phys. H)	7	General Physics (Phys. H)	7
Mineralogy (Geol. B)	6	Petrography (Geol. H)	3
Machine Design (Graphics C)	4	Graphic Statics (Graphics D)	4
Modern Language	2	Modern Language	2
Field Astronomy (Astr. E)	3	Forging (Shop-work C)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.
Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3
Hydraulics (Civ. Eng. H)	2
Power Plants (Elect. Eng. Q)	2
Masonry (Civ. Eng. M)	2
Advanced Surveying (Civ. Eng. S)	8

Second Half-Year.	Hours per week.
Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	2
Testing Laboratory (Civ. Eng. T)	3
Theory of Trusses (Civ. Eng. C)	3
Power Plants (Elect. Eng. Q)	2
Railroad Engineering (Civ. Eng. G)	5
Theory of Masonry Structures (Civ. Eng. E)	2

Summer Memoir.

SENIOR YEAR.

First Half-Year.	Hours per week.
Foundations (Civ. Eng. F)	2
Design of Bridges and Buildings (Civ. Eng. D)	4
Railroad Economics (Civ. Eng. R)	4
Water Supply (Civ. Eng. I)	3
Elementary Law	3
Electrical Machinery (Elect. Eng. P)	2
Thesis.	

Second Half-Year.	Hours per week.
Design of Bridges and Buildings (Civ. Eng. D)	4
Irrigation (Civ. Eng. J)	2
Sanitary Engineering (Civ. Eng. K)	3
Roads and Parks (Civ.Eng.L)	2
Mining A	3
Electrical Machinery (Elect. Eng. P)	2
Thesis.	

IRRIGATION ENGINEERING.

In order to meet the demand for men trained in the design, location and construction of irrigation work, a special course in irrigation engineering is afforded. The first year of this course is the same as in the Civil Engineering course; the second, third and fourth years differ from the regular Civil Engineering course in the

substitution of special work in agricultural chemistry, soil physics, advanced work in hydraulics, and the design of stone, timber and steel irrigation structures, for those subjects that bear less directly upon irrigation problems. The full equipment of the Civil Engineering department, including surveying instruments, testing machines, hydraulic laboratory and maps and plans, is available to the students of Irrigation Engineering.

The course differs from that in Civil Engineering in the following respects:

Sophomore Year.—Agricultural Chemistry (Chem. H) takes the place of Geology B during the first half-year and of Geology H during the second half-year, and Astronomy E is omitted.

Junior Year.—During the second half-year Soil Physics and Irrigation (Civ. Eng. J) take the place of Theory of Trusses (Civ. Eng. C) and Railroad Engineering (Civ. Eng. G), and Geology A replaces Power Plants (Elect. Eng. Q).

Senior Year.—During the first half-year Irrigation Law, Design of Irrigation Structures (Civ. Eng. O) and Hydraulic Engineering (Civ. Eng. N) take the place of Railroad Economics (Civ. Eng. R) and Elementary Law. During the second half-year Hydraulic Engineering (Civ. Eng. N) and Agriculture take the place of Roads and Parks (Civ. Eng. L) and Mining A. and Design of Irrigation Structures (Civ. Eng. O).

ELECTRICAL ENGINEERING.

The primary object of the course in Electrical Engineering is to develop an ability to solve electrical problems of a technical as well as of a commercial nature. The aim in the work is to give the students a broad foundation in the fundamental engineering principles, and then to secure practical familiarity with them by laboratory experimental work. The study of Electricity begins in the Sophomore year, when in the Physics course the basal laws of Electricity and Magnetism are mastered and the fundamental experiments performed in the laboratory.

The laboratory work embraces a detailed study of instruments, methods and electrical apparatus of modern practice both in direct and alternating currents.

Emphasis is laid on laboratory reports in which results of tests made by the students are discussed, both as to the theory and design of the machine under test and as to the applicability and accuracy of the method used.

The many plants in and about Colorado Springs afford unusual opportunity for the study of the application of electricity to long-distance transmission, mining, smelting, street car service and city lighting.

FRESHMAN YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Algebra (Math. A1) p. 52	3	Trigonometry (Math. A3) p. 52	3
Advanced Chemistry (Chem. B) p. 56	7	Descriptive Geometry (Graphics B)	8
Drawing (Graphics A)	6	Advanced Chemistry (Chem. B) p. 56	7
Woodwork (Shop work A)	6	Pattern-Making (Shop-work B)	6
Rhetoric and Composition (English B) p. 35	3	Rhetoric and Comp. (Eng. B)	3
Modern Language	3	Modern Language	3
Descriptive Geometry (Graphics B)	1		

SOPHOMORE YEAR.

First Half-Year.	Hours per week.	*Second Half-Year.*	Hours per week.
Analytical Geom. (Math. B)	3	Analytical Geometry (Math. B)	2
Differential Calculus (Math. C)	3	Integral Calculus (Math. C)	4
Qualitative Analysis (Chem. C)	9	Quantitative Analysis (Chem. D)	9
General Physics (Phy. H.)	7	General Physics (Phy. H)	7
Forging (Shop-work C)	3	Graphic Statics (Graphics D)	4
Machine Design (Graphics C)	4	Modern Language	2
Modern Language	2	Forging (Shop-work D)	3

Summer Memoir.

JUNIOR YEAR.

First Half-Year.	Hours per week.
Mechanics (Math. J)	4
Resistance of Materials (Civ. Eng. B)	3
Hydraulics (Civ. Eng. H)	2
Power Plants (Elect. Eng. Q)	2
Precise Measurements (Physics K)	6
Machine work and tool-making (Shop-work D)	6
Direct Current Machinery (Elect. Eng. A)	4

Second Half-Year.	Hours per week.
Mathematics J	4
Civil Eng. B	2
Testing Laboratory (Civil Eng. T)	
Alternating Current Theory (Elect. Eng. B)	3
Elect. Eng. Q	2
Shop-work D	6
Elect. Laboratory (Elect. Eng. C)	3
Electrical Engineering Measurements (Elect. Eng. D)	2
Principles of Dynamo Design (Elect. Eng. E)	2
Electrical References (Elect. Eng. O)	2

SENIOR YEAR.

First Half-Year.	Hours per week.
Alternating Current Machinery (Elect. Eng. F)	3
Direct Current Laboratory (Elect. Eng. G)	3
Electrical Engineering Instruments (Elect. Eng. H)	1
Central Station Design (Elect Eng. I)	6
Experimental Engineering (Elect. Eng. J)	3
Electrical References (Elect. Eng. O)	2
Theory of Electro-Chemistry	2
Elementary Law (Law A)	3
Thesis.	

Second Half-Year.	Hours per week.
Electrical Power Transmission (Elect. Eng. K)	3
Alternating Current Laboratory (Elect. Eng. L)	3
Electrical Machinery (Elect. Eng. M)	6
Practical Electro-chemistry (Elect. Eng. N)	3
Electrical References (Elect. Eng. O)	2
Elect. Eng. H	1
Inspection Tours.	
Thesis.	

Departments of Instruction

MINING.

PROFESSOR GRISWOLD.

A. *Excavation, Tunneling, Boring and Shaft-sinking.*—Excavation of rock and earth; explosives; drilling and blasting; driving and support of railroad tunnels; drilling, boring and shaft-sinking. Second half of Junior year for Mining Engineers and of Senior year for Civil Engineers, 3 hours.

B. *Mine Engineering.* — Prospecting; exploration, development, methods of working; surface handling and transportation; shipment and storage of minerals; drainage; water supply; ventilation and accidents. First-half of Senior year, 2 hours.

C. *Ore Dressing.*—Crushing of ores by jaw crushers, rolls, gyratories, and stamps; sizing by screens, classifiers, etc.; sorting by jigs and on tables; slime treatment. First half of Senior year, 3 hours.

D. *Mine Plant and Equipment.*—Hoisting, drainage, ventilating and compressed air plants; machine drills; coal-cutting machinery; underground handling and haulage; ore bins; trestles; retaining walls; building materials. Second half of Senior year, 3 hours.

E. *Mine Plant Design.*—General layout of surface plant and essential features to be considered in the necessary buildings. Design in detail of skips, skip dumps, cages, head frames, cage keeps, skip gates and ore bins.

One hour lecture and 3 hours drawing per week.

F. *Mine Administration.*—Organization and business management; mining and metallurgical accounts; cost of mining and metallurgical operations. Second half of Senior year, 1 hour.

G. *Mining Laboratory.*—Working tests; adjustments and operation

of concentrating machinery. Senior year, afternoons for three weeks.

METALLURGY.

PROFESSOR GRISWOLD.

A. *Assaying.*—Sampling and assaying of gold, silver, copper and lead ores, mattes and bullions, and the chemistry of cyanide solutions. Lectures and laboratory practice. Second half of Junior year, three afternoons a week. Fee, $15.

B. *General Metallurgy.*—Fuels—solid, liquid, and gaseous; furnaces, shaft and reverberatory; refractory materials; fluxes and slags; computation of furnace charges; general arrangement of plant. Second half of Junior year, 1 hour.

C. *Metallurgy of Copper.*—Ores of copper; roasting sulphide ores; smelting of metallic, oxide and sulphide ores; pyrite smelting, matte smelting; conversion of matte to blister; refining of barren blister; electrolytic refining of blister; recovery of gold and silver from slimes. Second half of Junior year, 3 hours.

D. *Metallurgy of Lead.*—Ores of lead; roasting, smelting in ore hearths, reverberatory and shaft furnaces; softening, desilverizing and refining of base bullion; parting of Doré bullion. First half of Senior year, 2 hours.

E. *Metallurgy of Gold.*—Recovery of gold from alluvial deposits; panning, sluicing, hydraulicking and dredging; stamping and amalgamation of gold ores; general features of treatment of sulphide and telluride ores; fine grinding and cyaniding; bromo-cyaniding; chlorination. First half of Senior year, 2 hours.

F. *Metallurgy of Silver and the Minor Metals.*—Discussion of the methods of recovery of silver not given under copper and lead. Metallurgy of zinc, aluminum, nickel, cobalt, tin, mercury, etc. First half of Senior year, 1 hour.

G. *Metallurgy of Iron and Steel.*—Ores of iron; smelting; manufacture of white and grey pig, wrought iron, bessemer, open hearth, cement and crucible steels; constitution of cast irons and steels; physical and chemical properties, commercial and engineering specifications. Second half of Senior year, 2 hours.

H. *Metallurgical Laboratory.*—Practice in pyrometry, the heat treatment of steels, roasting of ores, desilverizing of lead, cyaniding, chlorination and amalgamation. Senior year, afternoons for four weeks.

CIVIL AND IRRIGATION ENGINEERING.

PROFESSOR LYON, ASSISTANT PROFESSOR MOORE AND ASSISTANTS.

A. *Theory and Practice of Surveying.*—Construction, use and adjustment of instruments; pacing, use of chain, compass, level and transit; contouring and levelling by hand; cross-sections; theory of stadia measurement; azimuth traverse; balancing survey; mapping. Field problems are assigned on the basis of the students' field experience and future needs. Four hours' credit, second half, Freshman year. 2 recitations and 2 afternoons' field or office work. *Required of Civil, Irrigation and Mining Engineers.* Fee, $4.

B. *Resistance of Materials.*—Laws of elasticity in homogeneous materials; coefficients of elasticity; relations between stresses and strains; common theory of torsion and flexure; elastic limits, working stresses and ultimate resistance of wrought iron, cast iron, steel, alloys, timber, building stones, concrete and masonry; simple and continuous beams; design and construction of iron, steel, and timber columns and beams, including design of plate girders; theory of concrete-steel construction with applications; shafts; cables, specifications. 3 hours' lectures and recitations, first half, and 2 hours, second half.

C. *Theory of Trusses.*—The truss element; simple cantilever and noncontinuous trusses with parallel chords; fixed and moving loads; through and deck spans; position of any system of

concentrated moving loads for greatest chord and web stresses, when chords are parallel and when they are not so; combination of analytical and graphic methods; skew and irregular trusses; application to bridge and roof trusses; arched ribs. 3 hours' credit, second half, Junior year. Lectures and recitations with problems and design work. *Required of Civil Engineers.*

D. *The Design and Construction of Bridges, Roofs and Buildings.*—Railway and highway bridges; pin and riveted connections; single and multiple systems of bracing; the design of details for bridges, roofs and buildings; floors for railway and highway bridges; design and operation of draw bridges, including engines, locking, lifting and turning machinery; cantilever structures; wind loads and stresses; single and double track viaducts or trestles in iron, steel and timber; complete design of a railway bridge, with estimates of cost. 4 hours' credit, Senior year. Lectures, recitations and design work in the drafting room. *Required of Civil Engineers.*

E. *Theory of Masonry Structures.*—Pressure and abutting power of earth; design and construction of retaining walls; stability of masonry structures, including towers and chimneys; theory and design of arches; theory and design of reservoir walls, earth and high masonry dams; applications of the theory of concrete-steel design; 2 hours' credit, second half, Junior year. Recitations, lectures and design work in the drafting room. *Required of Civil and Irrigation Engineers.*

F. *Foundations.*—Foundations of steel grillage and of concrete-steel for buildings; safe loads on masonry and foundation beds; examinations of foundation sites; pile driving and pile foundations; sheet-piling and coffer-dam methods; pneumatic foundations and caisson work; open dredging; bridge piers of masonry and steel; deep foundations; sub-aqueous tunneling. 2 hours' credit, first half, Senior year. Lectures and design work. *Required of Civil and Irrigation Engineers.*

G. *Railroad Engineering.*—Reconnaissance; preliminary survey; maps and profiles; location; cross-sections; earthwork computa-

tions; mass diagram; simple, compound and transition curves; frogs, switches, and crossings; yard layouts for freight and passenger use; construction of wooden trestles and masonry culverts; tunnels; track; ordinary and extraordinary methods of drainage; water supply, its quality, storage and delivery; preservation of timber; block signals; general maintenance. The field work of this course involves the location and cross-sectioning of a short railroad line, together with the preparation of maps, profiles and estimates necessary to put it under construction. 3 recitations and 2 afternoons' field or office work, second half Junior year. *Required of Civil Engineers.* Fee, $4.

H. *Hydraulics.*—Flow of water through orifices; time required for discharge of canal locks and similar volumes; weir discharge and gauging by weirs; gauging of water for irrigation systems; flow through and discharge of pipes; design of pipe systems; the Venturi meter; flow and discharge of open canals and rivers; gauging streams; principles of impulse and of reaction water wheels. 2 hours' credit, first half. Recitations and problem work. *Required of Junior Civil Engineers and of Senior Mining Engineers.*

I. *Water Supply.*—Rainfall and storage; flow of streams; influence of soils, elevation and geologic characteristics of water-shed; methods of supply; underground flow; reservoir construction; distributing systems; house-supply and wastage. 3 hours' credit, first half, Senior year. Recitations, collateral reading and design work. *Required of Civil and Irrigation Engineers.*

J. *Irrigation Engineering.*—Irrigation of land; amounts and periods of application; grades, cross-section and capacity of canals; surveys for irrigation works; source of water supply; hydrographic data; Colorado streams; return of seepage waters; irrigation by pumping. 2 hours' credit, second half. Lectures, recitations and assigned reading. *Required of Civil Engineers in Senior year, and of Irrigation Engineers in Junior year.*

K. *Sanitary Engineering.*—Treatment and disposal of sewage and refuse by sedimentation, precipitation and use of septic tanks; treatment of effluent by continuous and intermittent sand filtration; fertilization; disposal of sludge; sand filters; causes of pollution of potable water, and its purification by continuous and intermittent sand filtration; sewage and surface drainage of cities and towns; separate and combined systems of sewers; capacity of mains and branches; catch-basins, manholes; flush-tanks; outfalls; grades and sections; flow and discharge of sewers; construction. 3 hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil and Irrigation Engineers.*

L. *Roads, Pavements and Parks.*—Surveys and locations; drainage and grades; foundations; selection and treatment of materials;; maintenance of roads and pavements; design, construction and maintenance of parks and parkways. 2 hours' credit, second half, Senior year. Lectures, recitations and assigned readings. *Required of Civil Engineers.*

M. *Masonry.*—Cement, concrete and masonry; stone and brick, requisites, tests, durability, classifications, and specifications; stone cutting, quarrying, dressing and bedding; manufacture of brick; composition and manufacture of limes and cements; their requisites, tests, specifications, preservation and use; natural and Portland cements, sand, gravel, broken stone; proportions and quantities of concretes; economic proportions; concrete mixing and depositing; artificial stones; preservations; methods of quarrying; drilling, channeling and wedging, use of explosives; classification and specifications of stone and brick masonry; measurements and cost; strength and durability; bearing power of soils; designing the footings; building foundations; safe loads on masonry; examinations of foundation sites; pile driving and pile foundations; sheet-piling and cofferdams; pneumatic foundations and caissons; open dredging; bridge piers; deep foundations. Recitations, lectures and notes. 2 hours' credit, first half, Junior year. *Required of Civil, Irrigation and Mining Engineers.*

N. *Hydraulic Engineering.*—Continuation of Course H. Collection and storage of water; analysis of hydrographic data with particular reference to Colorado and other western states; irrigattion reports; organization and administration; pumps and pumping machinery; principles involved in the design of reservoirs, canals and irrigation structures. 2 hours' credit, Senior year. *Required of Irrigation Engineers.*

O. *Design of Irrigation Structures.*—Practical application in the drafting room of the principles studied in the courses in Hydraulic Engineering, Resistance of Materials, and Masonry Structures to actual design work. 4 hours' credit, Senior year. Study of plans of existing structures, conferences and design work. *Required of Irrigation Engineers.*

P. *Hydraulic Laboratory.*—Application in the laboratory of the principles and theory studied in Course H. *Required of Junior and Senior Civil Engineers.* Open to those who have registered in Course H. .

R. *Railroad Economics.*—Sources and value of train resistance; the relation of curvature and grades to velocity and maximum train load; effect of momentum; balance of grades for unequal traffic; analysis of operating expenses; cost of extra distance, curvature, rise and fall, and of additional trains; effect of road bed on cost of running trains; economic value of distance, curvature, rise and fall, and of grades; pusher grades; value of additional traffic; improvement of old lines; ordinary and extraordinary methods of drainage; standard plans; estimates of cost. 4 hours' credit, first half Senior year. Lectures, recitations, field work, problems and design work. *Required of Civil Engineers.*

S. *Advanced Surveying.*—Continuation of course A. Topographic surveying; hydrographic surveying; city surveying; geodetic surveying. Recitations, lectures, and assigned reading. The field work problems are assigned on the basis of the students' previous field experience. The following surveys and maps are required: transit and stadia topography; plane table topography; Polaris observations; solar observations; repe-

tition traverse; reservoir site; street grades; city subdivision; hydrographic survey; triangulation survey; sextant work. Students seeking advanced credit in surveying must present note-book covering the work for which credit is sought. 2 recitations and 2 afternoons field or office work, first half Junior year. *Required of Civil Engineers.* Fee, $4.

T. *Testing Laboratory.* Tests of the materials of construction, including steel, wrought iron, cast iron, brass, brick, stone, cement, concrete and timber. Each student is required to make individual tests and reports. One afternoon per week. *Required of all Junior Engineers.* Fee, $4.

V. *Surveying.*—A continuation of Course A to be taken by Mining Engineers. Profiles for tramways, pipe lines, and mine railways; railway location; earthwork computations; frogs and switches.

W. *Mineral Land and Mine Surveying.* — Direct solar observations; solar attachnients; measurmements; location surveys; patent surveys; field notes; land office and records; methods of surveying coal mines; methods of surveying metal mines.

Courses V and W are taken together in the first half Junior year. 2 recitations and one afternoon field or office work. *Required of Mining Engineers.* Fee, $2.00

ELECTRICAL ENGINEERING.

PROFESSOR ARMSTRONG AND ASSISTANTS.

A. *Direct Current Machinery.*—Discussion of fundamental laws of electricity and magnetism, theory of the direct current dynamo and motor, the fundamental principles involved, study of characteristics of different types and their various applications. Text, Franklin and Esty's *Elements of Electrical Engineering,* Vol. I. First half of Junior year, 4 hours.

B. *Alternating Current Theory.*—The various electrical quantities are discussed analytically and graphically; methods of alternating

current measurements, inductance, capacity, impedance. Text, Franklin and Williamson, *Alternating Currents.* Second half of Junior year, 3 hours

C. *Electrical Laboratory.*—A laboratory course devoted to the study of various types of commercial instruments, their calibration and action under various conditions of operation.

D. *Electric Lighting.*—Principles of electrical illumination.

E. *Principles of Dynamo Design.*—A course of exercises on the discussion of materials of construction and method of windings with the electrical and magnetic calculations for direct current dynamos and for transformers. Text, S. P. Thompson's *Design of Dynamos.* Second half of Junior year, 2 hours.

F. *Alternating Current Machinery.*—The study of standard polyphase systems. The design and construction of alternating current apparatus, including single-phase, two-phase and three-phase alternators, synchronous and induction motors, rotary converters, and static transformers; and their operation both singly and in combination with each other. Texts, Oudin's *Standard Polyphase Systems,* Franklin and Esty's *Electrical Engineering,* Vol. II. First half of Senior year, 3 hours.

G. *Direct Current Laboratory.*—The management and testing of direct current dynamos and motors. The work includes the ordinary tests of heating, efficiency, speed-regulation, parallel and three-wire-system operation. Fee, $3.00. First half of Senior year, one afternoon a week.

H. *Electrical Engineering Instruments.*—A course of study devoted to the consideration of various types of commercial measuring instruments for both direct and alternating current work: their general characteristics, accuracy and possible sources of error. Senior year, 1 hour.

I. *Central Station Design.*—This includes the calculation and design of a lighting, power or traction station. The student is given the site and must design a plant to fulfill the given conditions, cost of coal, water, price of land, etc. The sizes of engines,

boilers, dynamos and accessory apparatus best fitted for those conditions are calculated and the plant drawn to scale. First half of Senior year, 6 hours.

J. *Experimental Engineering.*—A laboratory course devoted to the testing of planimeters, steam engine-indicators, pumps, boilers and engines. Fee, $3.00. First half of Senior year, one afternoon a week.

K. *Electrical Power Transmission.*—This work is a review of the preceding work combined with the study of generation, distribution, transmission and consumption of electrical energy. The problems of electric lighting, electric railways and long distance high voltage transmission are discussed. Second half of Senior year, 3 hours.

L. *Alternating Current Laboratory.*—A laboratory course. The testing and management of single and polyphase alternators and transformers; the experimental operation of various types of machines in combination. Fee, $3.00. Second half of Senior year, one afternoon.

M. *Electrical Machinery.*—This includes the design of a direct current dynamo based on the work in Course J; and the design of a transformer to meet various conditions of transmission. Second half of Senior year, 6 hours.

N. *Practical Electro-chemistry.*—A course of experiments on the application of electricity in the manufacture of chemicals, electro-plating, electric furnace, etc. Second half of Senior year, 3 hours.

O. *Electrical References.*—A course of reference work in connection with the laboratory reports and review of important articles in the current scientific magazines. Second half of Junior year and throughout Senior year, 2 hours.

P. *Electrical Machinery.*—This course is a digest of Courses A, B, C and D. *Required of all Civil, Mining and Irrigation Seniors.* Senior year, 2 hours.

Q. *Power Plants.*—Steam engines and their mechanism; mechanical features and construction of condensing, compound, and multiple expansion engines; engine valve gears; details of construction; erection and setting; piping accessories; boilers and their construction; feed water heaters; pumps and secondary apparatus. General plans and design of building. Text, Hutton's *The Mechanical Engineering of Power Plants.* Junior year, 2 hours throughout the year. *Required of all Engineers.*

GRAPHICS.

ASSISTANT PROFESSOR MOORE.

Students are expected to devote more time to drawing, in the Freshman and Sophomore years, than the number of hours assigned in the schedule, but may do the extra work at such hours as suit their convenience.

Students in all engineering courses are expected to provide themselves with a good and complete set of drawing instruments—design and make to be approved by the instructor.

A. *Elements of Drawing.*—This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right line and the bow pen, conventional representations, mathematical curves, cycloidal and other motion curves, isometric, oblique and orthographic projections, working drawings, tracings, the form and proportions of standard letters, both freehand and ruled, methods of spacing and laying out titles. First half of Freshman year, 6 hours. *Required of all Engineers.*

B. *Descriptive Geometry.*—The work consists of recitations from text-books and the graphic solution of problems. After the necessary elementary problems, special attention is given to the practical side of this subject, in its relations to stereotomy, pattern-making, sheet metal work and machine drawing. First half of Freshman year, 1 hour. Second half of Freshman year, 8 hours. *Required of all Engineers.*

C. *Machine Design,* in the Sophomore year, includes recitations from text-books, the copying and tracing of machine drawings, drawing to scale from models and machine parts, working, detail and assembly drawings, laying out tooth-wheel gearings, and the making of original working drawings from specifications. First half of Sophomore year, 4 hours. *Required of all Engineers.*

D. *Graphic Statics.*—This course includes the study of forces, stresses, couples and moments of inertia, and is introductory to the later course on Theory of Truss. Recitations from text-books are followed by the application of the principles in the solution of practical problems in roof trusses, involving permanent and temporary loads, snow loads and wind pressures. Second half of Sophomore year, 4 hours. *Required of Civil and Electrical Engineers.*

SHOP WORK.

Superintendent Collais.

In the mechanical laboratories it is aimed to give students some knowledge of carpentry, wood-turning, pattern-making, blacksmithing, machinists' bench and vise work, and iron lathe and machine tool work. Practical talks and lectures are given.

A. *Bench Work in Wood.*—Students acquire a practical knowledge of the handling of tools and keeping them in order, and of executing models and joints in wood, that develop constructive principles in engineering work. *Required of all Engineers.* Fee, $4.00.

B. *Pattern Making.*—Patterns of parts of machinery are made, also cores, valves, valve stems, models in wood turning, pulleys, sheaves, etc. *Required of Electrical Engineers.* Fee, $4.00.

C. *Forging.*—Students acquire a practical knowledge of the handling and working of iron, mild steel and tool steel, and of the operations of bending, welding, forming, bolt-making, tempering and tool-making. *Required of all Engineers.* Fee, $4.00.

D. *Work in Iron,* including bench-work, chipping, filing, accurate fitting, scraping surfaces, tool-making and finishing, thread-cutting by hand. *Required of Electrical Engineers.* Fee, $4.00.

E. *Machine Work.*—

(*a.*) With the lathe: turning, boring, thread-cutting, tapering, eccentric turning, etc.

(*b.*) With the milling machine: surfacing, slotting, dove-tailing, taper work, fluting, gear-cutting, spiral-grooving, etc.

(*c.*) With the shaper: surfacing, cubing, cutting key-ways, etc.

(*d.*) With the drill press: boring and countersinking, tool grinding (including all machine tools).

Required of Electrical Engineers. Fee, $4.00.

The School of Forestry

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.,
President.

WILLIAM CODMAN STURGIS, Ph. D.,
Dean and Lecturer in Vegetable Pathology.

H. A. WINKENWERDER, M. F.,
Assistant Professor of Forestry.

FLORIAN CAJORI, Ph. D.,
Professor of Mathematics.

GEORGE J. LYON, C. E.,
Professor of Civil Engineering.

CHARLES W. D. PARSONS, A. B.,
Professor of Physics.

WILLIAM STRIEBY, A. M., E. M.,
Professor of Chemistry.

EDWARD C. SCHNEIDER, Ph. D.,
Professor of Biology.

GEORGE IRVING FINLAY, Ph. D.,
Professor of Geology.

GEORGE MAXWELL HOWE, Ph. D.,
Professor of German.

HOWARD MOORE, C. E.,
Assistant Professor of Graphics.

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* See foot-note to p. 102.

Organization of the School

In the spring of 1905, the increasing demand for instruction in theoretical and applied forestry led to the establishment of the Colorado School of Forestry as a department of Colorado College. The first step in the organization of the School was the acceptance on the part of the College of a gift of thirteen thousand acres of forested land, known as Manitou Park, and situated a distance of twenty miles from Colorado Springs. The Park has been for some years used as a summer-resort, and visitors have been received at a small hotel and a number of adjacent cottages on the property. These, together with a smaller group of cottages a mile from the hotel, have now become available for the uses of the School of Forestry.

The Park itself affords unusual opportunities. About two-thirds of its area is covered with a good stand of pine and spruce, much of the timber being now mature and ready for cutting. There is an abundance of young growth to replace the timber removed, and the rich land along a stream which waters the valley offers an excellent opportunity for the study of tree-planting, the establishment of nurseries and experiments with various tree-seeds.

Much of the instruction in technical and applied forestry is given at Manitou Park; the instruction preparatory to the study of forestry proper, e. g. in Chemistry, Physics, Biology, etc., is given at Colorado College.

Object of the School

The principal aim of the School is to give a thorough training to students who intend to adopt forestry as a profession. In this connection it may be said that no profession today offers a better opportunity to a young man of good physique and the desire for an out-door life and plenty of hard work. The expert forester need never fear lack of employment. The Government Forest Service is constantly on the lookout for good men, and the demand for trained foresters on the part of private land-owners, is steadily increasing.

While the School has in view, first and foremost, the training of professional foresters, it recognizes the fact that there is a large number of people who have a passing or local interest in forestry, but who lack either the time or the desire for an extensive course. For the benefit of such, the School proposes to offer in the near future special short courses of study. These courses will be especially adapted to forest-rangers, whose duties permit of only brief absences from the Reserves.*

Duration and Arrangement of Course

The course, as at present provided for, covers three full years, as outlined in the curriculum given below. Each year is divided into two periods covering, respectively, a Winter and a Summer course of study. The Winter course corresponds to the regular College year of approximately nine months. The Summer course covers approximately the eight weeks between July fifteenth and September fifteenth.

By this arrangement the students are enabled to devote the full College year at Colorado College to studies related and preparatory to forestry proper, and then to devote two months in the summer to the study of technical and applied forestry in the laboratory at Manitou Park, as well as in the forests and the lumber camps.

At the close of the three-year course the student who has completed it satisfactorily should be fitted to fill a position either in the Government Forest Service or in private employ as an expert forester.

The concentration of field work in forestry during a Summer term of two months duration also presents the advantage of giving an opportunity to persons, properly qualified, who may be pursuing studies elsewhere during the academic year, to take

*While the present edition of this bulletin was in press, Professor Winkenwerder was appointed to succeed Professor Baker as assistant professor of forestry. This change led to a revision of the forestry curriculum in certain minor features. A prospectus will shortly be issued giving full details of the course as revised, copies of which may be obtained by applying to the Dean of the School.

the Forestry course at Manitou Park while still connected with their respective institutions.

Since the ability to finish the full course in three years largely depends upon the degree of preparation, especially in Science, shown by applicants for admission to the School, preference is given to those who have had some previous training in the Natural Sciences.

Requirements for Admission

Before registering, each candidate must present to the Dean a certificate of moral character signed by some responsible person in the community in which he has made his home.

No intellectual test is applied to candidates for admission, but every candidate must satisfy the Dean of his ability to pursue the studies required in the course. In general, a candidate should have at least a High School training or its equivalent.

Fees and Expenses

The fee for tuition is sixty dollars for each year of the course. This does not include the small special fee charged in certain of the prescribed laboratory courses, nor does it include the railway fares to and from Manitou Park. The tuition fee for students taking only the Summer course will be arranged on application to the Dean.

Course of Study

COURSES GIVEN IN COLORADO COLLEGE.

First Half of the First Year.

Mathematics A. See p. 52.
Graphics A. See p. 97.
Biology A. See p. 58.
German A. See p. 38.
English B. See p. 35.
Economics A. See p. 44.

Second Half of the First Year.

Mathematics A. See p. 52.
Biology A. See p. 58.
German A. See p. 38.
English B. See p. 35.
Silviculture A.
Forest Botany A.

First Half of the Second Year.

Chemistry B. See p. 56.
Physics B. See p. 54.
Biology J. See p. 58.
Or
Geology A. See p. 61.
German C. See p. 38.
Forest Botany B.
Silviculture B.

Second Half of the Second Year.

Chemistry B. See p. 56.
Physics B. See p. 54.
German C. See p. 38.
Forestry Geography.

Civil Engineering L. See p. 91.
Silviculture C.

FIRST HALF OF THE THIRD YEAR.

English C. See p. 35.
Meteorology.
Wood Technology.
Forest Botany C.
History of Forestry.
Forest Management C and D.

SECOND HALF OF THE THIRD YEAR.*

Forest Entymology.
Soil Physics.
Forest Law.
Lumbering.
Forest Management E.

COURSES GIVEN AT MANITOU PARK.

(Summer Courses.)

FIRST YEAR.

Forest Botany B.
Mensuration A.
Surveying A.

SECOND YEAR.

Silviculture D.
Forest Management A and B.
Lumbering.
Office Work in Surveying.

THIRD YEAR.

The Practice of Forestry.

This course will be given from April to the close of the College year. Practical field-work in Surveying, Timber-estimating, Forest-mapping and Road-construction will be taken up.

*During April all third-year studies will be replaced by practical field-work in surveying, timber-estimating and road-building at Manitou Park.

School of Music

FACULTY.

EDWARD DANFORTH HALE, A. M. 1123 N. Weber St.

Dean of the School of Music and Professor of the Theory and Literature of Music, and the Pianoforte.

A. B. (Williams College), '80; A. M. (*ibid.*), '83; Professor at the New England Conservatory, '85-'04; Colorado College, '05.

MRS. ROBERT BRISCOE. 805 N. Weber St.

Instructor in Violin.

Graduate, Conservatory of Leipsic, '95; Pupil of Hans Sitt, '90-'95; Colorado College, '00.

MRS. FREDERICK A. FAUST. 112 E. Dale St.

Instructor in Pianoforte.

The Vassar Music School, '94; Diploma American Society of Musicians, '94; Colorado College, '01.

MRS. GEORGE MAJORS PERRY. 110 St. Vrain Court.

Instructor in Voice Culture.

Oberlin Conservatory, '98-'02; Pupil of Mrs. Seabury Ford, William Saal, Felix Hughes, Herbert Witherspoon; Colorado College, '05.

COURSE OF STUDY.

A. *General Musical Culture.*—A reciprocal study of composition and the pianoforte. Original work in composition from the outset combined with thorough experimental reading of Goetschius, *Material of Musical Composition and Applied Counterpoint;* Gow, *Structure of Music;* Chadwick, *Harmony;* Foote and Spalding, *Modern Harmony;* Cutter, *Harmonic Analysis;* Spalding, *Tonal Counterpoint;* Cady, *Music-Education.* Other authorities consulted. Material of the pianoforte study minute-

ly analyzed, structurally and technically. Further contact with the pianoforte study obtained through the weekly conferences, which are required. Pianoforte study devoted to the masterpieces of musical literature to the end of musical scholarship. The technical work carried on by eclectic, scientific methods, as in the special pursuit of virtuosity. Two or more hours. Tuition, $50 each half-year.

Upon the completion of Course A and of the prescribed college studies as outlined in the prospectus of the School of Music, the student will receive the degree of Bachelor of Music.

B. *Pianoforte, Organ, Voice, Violin, or Violoncello.*—Lessons daily. Tuition, $35 each half-year.

C. *Composition* (including *Harmony and Counterpoint or Orchestration.*) One or more hours weekly. Tuition, $15 each half-year.

The weekly conferences are devoted to the discussion of all topics vitally related to music study, to the first experience of pupils in playing in public—a kind of artist-apprenticeship—and to the structural and technical analysis of the works of the masters. This and other phases of school work, recital-lectures, recitals by faculty and pupils, solfeggio and normal work, are free to all students of the School and College.

Some practical acquaintance with physiological psychology is indispensable to the intelligent prosecution of music study. Students in Course A are expected, and all others are urged, to join the College classes in psychology (see p. 29).

DIPLOMA.

The diploma of the School, given only for satisfactory attainment of musicianship, is a guarantee both of thorough ability as a musician and of the equipment of a competent teacher.

The Cutler Academy

Cutler Academy, a preparatory school for boys and girls, is named after the late Henry Cutler, of Massachusetts, a generous and steadfast friend of Colorado College. It is under the control of the Board of Trustees of the College. It provides a thorough preparation for any college in the United States. While the preparatory training is the principal aim, the plan of study is so arranged as to meet the requirements of students who do not propose entering upon college work. Classical and Scientific courses are given, in each of which the work covers four years. Many of the advantages enjoyed by the students of the College are shared by the pupils of the Academy.

The Academy receives girls as *day students* only, and therefore is open only to those girls whose homes are in Colorado Springs, or who have relatives with homes in Colorado Springs, with whom they may live.

Full information as to admission, courses, etc., is given in the Cutler Academy Bulletin, which will be sent on application.

Correspondence concerning Cutler Academy should be addressed to the Head Master, J. W. Park.

General Information

LOCATION.

Colorado College is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Founded in 1871, under the direction of men of shrewd foresight and broad views, it has maintained from the beginning high standards of morality and culture. Saloons and the attendant destructive influences are absent. Radiating railroad systems and neighboring gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers, but the invalids are so far outnumbered that the place has none of the depressing influence so often observed at noted health resorts. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous canons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the dryness and rarity of the air, and by reason of the opportunity for outdoor exercise afforded by the great number of fine days (helpful in cases of malarial disease, asthma, and incipient phthisis). Students unable to work in other climates may here continue their studies, while at the same time making a permanent gain in health.

COLLEGE BUILDINGS.

The buildings of the College are situated on a tract of about 50 acres, in the heart of the best residence portion of the city.

All except the Gymnasium and the Mechanical Laboratory are of stone. Heat and electric light are furnished to all from a central plant.

Palmer Hall, completed in the fall of 1903, at a cost of $287,000, contains the offices of administration, the laboratories, and the general lecture rooms. It is 287 feet long and 95 feet wide. Besides a sub-basement, there are three stories, a basement and a first and second floor. The style of architecture is that which has been chosen for the entire system of buildings eventually to occupy the College reservation. The structure is fireproof. In the basement are laboratories for Chemistry and Physics, and a large demonstration room. On the first floor are the offices of administration, general lecture rooms, and other laboratories for Chemistry and Physics. The second floor contains the laboratories and lecture rooms for Biology, Geology and Mineralogy, and a large, well-lighted Museum for the natural science collections of the College. In the hallway is a life-size portrait of General William J. Palmer, executed by Mr. Herman G. Herkomer. The building was equipped at a cost of $50,000.

The Perkins Fine Arts Hall, named for one of the principal donors, the late Willard B. Perkins, of Colorado Springs, was completed in 1900. It is a two-story stone building, and cost $30,000. The lower story is a large auditorium, seating 600, in which the chapel exercises are held and concerts and lectures are given. This room contains a valuable pipe organ, given by Miss Elizabeth Cheney, of Boston, Mass., in memory of her brother, Charles P. Cheney. In the hallway stands a bronze statue of the Flying Mercury, presented by Mr. James F. Burns. The upper story contains the lecture and practice rooms of the School of Music.

The Library, given in 1894 by the late N. P. Coburn, of Newton, Mass., and costing $50,000, is of great architectural beauty and admirably adapted to its purpose. It is of the "Peach Blow" sandstone of Colorado, and its roof is of red tile with copper mountings. A full-sized cast of the "Winged Victory" of Samothrace stands at one end of the main hall. In recesses are marble busts of Antinous and Dante, and casts of the Hermes of Praxiteles and of Mercie's David.

Mr. A. L. Dickerman's collection of rare and valuable Indian curiosities adds to the interest of the room.

The Astronomical Observatory is the gift of Henry R. Wolcott, Esq., of Denver, and was completed in 1894. Besides the dome room it contains a lecture room, a transit room, and a photographic dark room.

The Mechanical Laboratory. Two buildings contain the dynamo room and the mechanical laboratories for carpentry, forging, and machine work.

The Gymnasium, built by the students of the College in 1891, contains a useful assortment of apparatus. See "Physical Training," p. 124.

The President's Residence, at the northern boundary of the campus, was purchased by the Trustees in 1888, and was remodeled in 1903.

Cutler Hall (formerly Palmer Hall), the oldest building on the Campus, was first occupied in 1880. It contains recitation rooms, and chemical, physical and biological laboratories. It is now devoted to the use of Cutler Academy.

COLLEGE RESIDENCES.

Hagerman Hall, built in 1889, is used as a home for young men. Besides the students' rooms, it contains a dining room accommodating one hundred and fifty persons, now used by a young men's boarding club, and the Y. M. C. A. reading room. On the roof are some of the Meteorological Station instruments, connected with the electric registering apparatus in the Observatory.

Montgomery Hall was erected and furnished in 1891 by the Woman's Educational Society, and presented free of debt to the College. It provides a comfortable home for young women.

Ticknor Hall, the generous and beautiful gift of Miss Elizabeth Cheney, of Wellesley, Massachusetts, was opened as a home for the young women of the College in January, 1898. Besides students'

rooms, it contains a dining-room, drawing-rooms, and guest-rooms, a study-room for the use of all young women of the College, and an infirmary capable of complete isolation. The infirmary is open to all young women living on the campus, and is in charge of a trained nurse, whose services, whether in the infirmary or in the students' rooms, are paid for by an annual fee of $5.00 from each young woman, due in September.

McGregor Hall, a commodious and convenient building, was opened in September, 1903, for use as a third residence for young women. It contains a fully equipped gymnasium.

A fourth residence hall is being erected. It is to have rooms for eighty young women. Its dining room is intended to seat two hundred. This building is to serve as a social centre for the life of the college.

No young woman will be received into the halls who is not of full college rank, who is less than sixteen years of age, and who is not taking at least fifteen hours' work or its equivalent. Young women from out of town are required to live on the campus. In the case of an overflow, suitable rooms in the vicinity will be arranged for by the Dean of Women.

LIBRARY.

MANLY D. ORMES, LIBRARIAN.

The Library building has been elsewhere described (see p. 110). In it are about 43,000 volumes and as many pamphlets. The leading literary and scientific journals are received, as are also the United States Government publications and those of the State of Colorado. Of United States documents the library now has about 9,000 volumes, including the records of Congress complete from 1847, and many valuable records for the period 1774-1847. These documents are arranged on the plan adopted in the library of the Superintendent of the United States Documents at Washington.

The Medical Alcove was created in 1894, when the late Dr. B. F. D. Adams, of Colorado Springs, presented to the College his extensive medical library. The El Paso Medical Society contributes the transactions of Medical Societies and standard works purchased

by the Society, in number about a hundred volumes a year. In 1896 the collection was enlarged by the gift of 250 volumes and 300 pamphlets from the late Dr. E. C. Kimball, of Colorado Springs, in 1904 by the gift of 205 volumes from the library of Dr. James A. Hart, of Colorado Springs, and in 1907 by the gift of 633 volumes from the library of the late Dr. S. E. Solly. This last addition was especially rich in works on climatology and the treatment of the lungs.

The Coburn Library Book Club, organized in 1897, provides its members with the best new books, which are given to the Library after two years. The fee is $5 a year or $3 for six months. Members enjoy the full privileges of the Library. The Club has purchased about 2,700 books, of which nearly 2,500 have been given to the general Library.

The Wednesday Art Club and the local Chapter of The Daughters of the American Revolution have started collections of books on their special topics.

A reading room is provided with the current literary and scientific magazines, as well as a number of leading newspapers.

In 1904 the Engineering Department of the Library was installed in a basement in a room prepared for the use of the Colorado Polytechnic Society. In addition to the 1,500 volumes belonging to the College, it contains several valuable private libraries loaned by members of the society, to which students of the Engineering department have access.

In Room 44 of Palmer Hall are about 300 volumes which form the beginning of a department library for Greek and Latin. These books have been given to the Classical Department by Mrs. M. C. Gile.

LABORATORIES AND APPARATUS.

PHYSICS.

The Sophomore Laboratory contains, among other apparatus, a large standard clock equipped with a special magnetic contact-maker, a standard H. J. Green barometer presented by General William J. Palmer, a large Gærtner cathetometer, ballistic pendulum, Borda pendulum, Kater pendulum, chronograph, apparatus for determining

moduli of elasticity, an air thermometer, apparatus for determining vapor density and apparatus for determining viscosity of oils. A number of pieces of apparatus have been made by Mr. E. J. Hoff, of Colorado Springs, from original designs furnished by the department. The Photometer room is furnished with a three-meter photometer track, Lummer-Brodhun screen, and revolving apparatus for the photometric measurement of light sources.

The Electric Laboratory is equipped for the Junior and Senior experiments, as well as for the Junior work in the Electrical Engineering course. Some of the latest types of electrical apparatus are included in its equipment. Mention may be made of the following: a standard potentiometer, a Carey-Foster bridge, and a Hopkinson permeameter, from the Willyoung and Gibson Company; a Bose magnetic balance, an induction bridge, and a Beggerow electrometer, from the Siemens and Halske Company; a sensitive moving coil galvanometer, a standard of self-induction and a permeameter testing set complete, from the Hartmann and Braun Company; a students' magnetometer and a resistance thermometer, from the Cambridge (England) Scientific Company.

There are smaller laboratories for Junior and Senior experiments in Optics and Heat, and a photographic developing room.

The Lecture Room is furnished with projection apparatus for transparent slides and for opaque objects such as photographs, mechanical drawings and models.

The Apparatus Room contains the apparatus for demonstration work and that not in immediate use. Mention may be made of a large static machine presented by the Alumni Association of Colorado College, a Tesla X-Ray coil presented by Dr. Gerald B. Webb, of Colorado Springs, a large Michelson interferometer and a Fluess air-pump.

CHEMISTRY.

The Chemical Laboratories include: (1) The General Laboratory; (2) the Qualitative Laboratory; (3) the Quantitative and Electro-chemical Laboratory; (4) the Organic Laboratory; (5) the Assay Laboratory. The best features of modern arrangement and construction have been embodied. The lighting and ventilation have received especial care. The hoods are generously distributed in

every working room, and each hood is connected with a large separate flue. The ceilings are high, the light excellent, the desk and working space for each student is abundant and the drainage through iron covered floor drains is of the most approved modern type. The desks are provided with combination locks and fitted with very full sets of reagents and all facilities for the prosecution of the work in hand. Adjacent to the laboratories are the preparation rooms, which provide for the ready distribution of supplies. Smaller rooms, which are used for particular branches of chemical study, are supplied with appropriate apparatus,—fine balances, spectroscope, the best Schmidt and Hænsch polariscope, photographic apparatus, combustion furnaces, and a large assortment of metal and glass apparatus for general and analytical processes of investigation.

BIOLOGY.

The Biological Laboratories are eight rooms on the second floor of Palmer Hall. In these each student is assigned a desk, and in courses requiring microscopic observation is furnished with a microscope for which he is held responsible. There is an abundant supply of all kinds of glassware necessary for the various courses, also micrometer-eye-pieces, cameras, dissecting microscopes, paraffine bath, microtomes (Reichert's and Minot's), life-boxes and charts. For the courses in Zoology, Comparative Anatomy, etc., a number of mounted and disarticulated skeletons and anatomical models are provided. A large amount of the museum material is also available for illustration in these courses. The physiological laboratory is supplied with such Harvard apparatus as the capillary electrometer, rheochords, inductoriums, kymographs, moist chambers, muscle warmer, heavy muscle-lever, ergograph, pneumograph, work adder, manometers, interrupters, circulation scheme, respiration scheme, and a number of smaller pieces. In addition, there are on hand such pieces as Kronecher's mercury cup metronome, Ludwig's arm support and sphygmograph, Marey's cardiograph, stethoscope, Erlanger's and Cook's sphygmomanometers for blood-pressure determinations, Thoma-Zeiss hæmacytometers for the enumeration of the corpuscles of the blood, and Fleischl's hæmometer and Gower's hæmoglobinometer for the estimation of the hæmoglobin of the blood, Lombard's modification of Mosso's ergograph, a spirometer, and belt spirograph.

The equipment for Bacteriology includes an incubator, Arnold steam sterilizer, autoclav, hot-air sterilizer, Becker balance, Trœmner media scale, centrifuge, animal holders, culture jars, water sampling apparatus, inoculating water baths, double boilers, hot-water funnels, counting apparatus (Esmarch's and Wolff-huegel's) and other appliances essential to the work. For botanical courses clinostats, auxinometers and a variety of smaller apparatus are provided.

The Herbarium occupies a room in the Biological Department. The nucleus consists of a Colorado herbarium purchased from Marcus E. Jones. The larger part of the present collection is the Edward Tatnall herbarium, presented to the College by Miss M. H. Tatnall, of Elmira, N. Y. This collection, of about 22,000 species and varieties, includes representatives of all the great plant groups. Of these there are some 900 Algæ, 1,700 Lichens, 2,000 Bryophytes, 1,050 Pteridophytes, and 16,350 Angiosperms. These specimens, which are carefully and fully labeled, were collected in 23 different states, Canada, Sweden and England, by 65 collectors. A catalogue makes the herbarium especially valuable.

GEOLOGY.

Five rooms are occupied by the Department of Geology: a general lecture room and laboratory, mineralogical and paleontological laboratories, a department library and a photographic dark room. The general laboratory is provided with five large models and relief maps for the illustration of river work, glaciation, and vulcanism, together with a complete set of the geological maps of the United States Geological Survey and nearly 500 topographic maps. Suites of rock specimens are provided, covering all the main types of the igneous, sedimentary and metamorphic rocks, as well as representative specimens from important mining districts in Colorado. A carefully prepared collection of thin sections of rocks is available for microscopic study, covering the varieties of the igneous rocks and illustrating their mineralogy. One Siebert petrographic microscope of the 1904 model is provided for every two students.

In the mineralogical laboratory a general collection, numbering several specimens for each of the 175 minerals taught in the introductory course, is set out in open cases for the illustration of the crystal forms and the variations in the massive kinds. Each student

is given a working collection covering the same minerals. Crystallography is taught by means of 150 models of crystals in wood and by the aid of a small collection of transparent models. The material for the practice determinations required of every student embraces 3,000 specimens.

For the work in paleontology the collections of fossils in the College museum are employed. They are representative of a large number of the genera in the several classes of invertebrates.

The department library contains complete sets of the publications of the United States Geological Survey, Annual Reports, Monographs, Bulletins and Professional Papers, with about 150 of the annual volumes issued by the state surveys, and general works of reference.

PSYCHOLOGY.

The equipment includes the following: Azoux dissectible model of human brain; Deyrolle *"Deux Demi-Tete,"* showing distribution of cranial nerves; Deyrolle model of the spinal cord in cross section, much enlarged; Deyrolle model of the cord *in situ,* showing connections with the sympathetic; lantern slides of gross and microscopic structure of nervous system. (Models of the sense-organs are available from the Department of Biology, and cranial casts and crania of various races and animals from the Museum.)

One set of Helmnoltz resonators, set of low forks, set of ten mounted tuning forks, four extra forks, Edelmann whistle, Quincke tubes, (A Koenig sonometer is available from the Department of Physics.)

A direct current electric motor rotator with rheostat and speed recorder attached, spring suspension electric rotator, rheostat, Kirschmann photometer, Pillsbury speed reducer, Stoelting kymograph with magnetic speed control and long and short drums, 100 vibration tuning fork, triple electric recording pen, Jacquet graphic chronometer, Marey tambours, bell metronome, Vernier chronoscope, split-second stop-watch, plethysmograph, Smedley dynamometer, Titchener automatograph, olfactometer, temperature and pressure points, campimeter, after-image apparatus, colored and gray discs and papers, stroboscope, stereoscopes, Stratton's pseudoscope and telestereoscope, Nagel color-blindness test, visual acuity tests, spectrum chart, complication apparatus, Jastrow exposure apparatus.

OBSERVATORY.

The Observatory has a telescope of four-inch aperture, presented by Mr. Henry R. Wolcott, of Denver, a transit and a sidereal clock, both given by the late Charles S. Blackman, of Montreal, Canada, and several of the instruments of the College Meteorological Station. The largest of these instruments, the quadruple register, given by General Wm. J. Palmer, records minute by minute the direction and velocity of the wind and the sunshine and rainfall, by means of electric connection with instruments on the Observatory and on Hagerman Hall. In shelters are instruments for measuring and recording temperature and humidity. A Draper barograph, given by the late Dr. S. E. Solly, affords a continuous record of the atmospheric pressure. The Observatory possesses bound records of observations and instrumental registers of previous years, together with the beginnings of the meteorological library, valuable accessions to which have lately been received from General Palmer.

Special information has been furnished on request to the city engineer and to several railway companies, while tabulated statements of the current weather are supplied regularly to the local newspapers, to the city health officer, and through the Chamber of Commerce, to various applicants at home and abroad, who desire them for publication. Full statistical records are issued annually, as numbers of The Colorado College Publication.

The Observatory is regularly open to visitors on Thursday evenings.

THE WESTERN ASSOCIATION FOR STELLAR PHOTOGRAPHY.

Colorado College, in common with other educational institutions of the state, is interested in the success of the Western Association for Stellar Photography, an organization which was incorporated October 24, 1904, for the promotion of astronomical science by the use of photographic methods. The officers are: President, Edward C. Pickering, Director of Harvard College Observatory; Vice-President, Herbert A. Howe, Director of the Chamberlin Observatory, Denver; Secretary and Treasurer, Frank H. Loud, Colorado College.

The Association owns an equatorially mounted camera of small aperture, but of excellent definition and accurate mounting, a dupli-

cate of instruments in use at Cambridge, Mass., and Arequipa, Peru. This is the first fixed plant of the kind in Colorado. It is in operation on Nob Hill, about two miles east of the College grounds, and is yielding good results. Of these some use has already been made for purposes of instruction; particularly of Mr. W. N. Birchby's solar photographs, taken during a period of sunspot maximum, and showing numerous spots and groups.

MUSEUM.

WILLIAM LUTLEY SCLATER, DIRECTOR.

The Museum is on the second floor of Palmer Hall. Glass showcases extend on all sides of the room. The central part is taken up with the larger specimens. The megatherium and a restoration of the mammoth occupy the west half and the mounted skeleton of a whale occupies the eastern portion. Grouped around them are the large natural history specimens, casts of noted fossils, and at intervals are showcases for small specimens.

The foundation of the Museum was laid by the gifts of Prof. J. H. Kerr, the Rev. E. N. Bartlett, Dr. E. P. Tenney and Mr. George Fowler.

PALEOBOTANY is represented by two cases of Carboniferous, Cretaceous, and Oligocene plant remains classified by Mr. Baker.

PALEONTOLOGY.—Several cases are given up to the display of the invertebrate fossils, which are zoologically arranged. The collection contains typical and rare forms of foraminifera, corals, crinoids, brachiopods, mollusca and arthropoda. The mollusca and echinoderms collected by Prof. Cragin are for the most part from the lower Cretaceous. The mollusca from the Atlantic slope, presented by Prof. Wm. B. Clark, of Johns Hopkins University, are chiefly Tertiary. Besides an excellent geological record, the collection contains a series of casts of noted specimens.

The foundation for the collection in vertebrate paleontology was laid by the purchase for the College of the large paleontological cabinet of Prof. Cragin by General Wm. J. Palmer and the Colorado Springs Company. This collection consists of some 8,000 specimens from Colorado, Kansas, Indian Territory, Texas, and other states,

and includes remains of Pliocene horses, llamas, Miocene rhinoceroses and mastodons, Cretaceous saurians, and Tertiary fishes. It is of importance not only as supplying a large part of the geological record not otherwise represented in the Museum, but also as containing the types of many new species and some new genera of fossils. Among these type fossils the most important is the large plesiosaurian reptile *Trinacromerum,* the type of a new genus and species described from the Cretaceous of Kansas in 1888. Another valuable item of the collection is the extensive series of casts of fossil vertebrates given by W. S. Stratton. These casts include such forms as the Ichthyosaurus, Archæopteryx, Glyptodon, Dinotherium head, Elephas head, Mastodon head and tusks, Megatherium and a restoration of Colossochelys, Plesiosaurus, Mammoth and other forms.

Zoology.—The collections of Invertebrate Zoology occupy a series of table cases along the north side of the room. They comprise representatives of the different groups, such as the Protozoa, Cœlenterata Mollusca, etc. These have been recently rearranged and provided with descriptive labels which it is hoped will be found useful to students.

A representative series of the Myxomycetes or Mycetozoa of Colorado collected by Dr. Sturgis and Mr. Ellsworth Bethel have recently been added to these collections, and Professor Schneider has presented a large series of the Butterflies and Moths of Colorado mounted in Denton tablets.

Vertebrates are well represented by the large natural history collection received through the generosity of W. S. Stratton. It contains 29 species of fishes, among which are the blue-shark, a few ganoids, and several curious tropical forms. Among the 23 species of reptiles, the most important are the Indian crocodile, python, iguana and the gila monster. The collection includes 442 species of birds, including such interesting forms as the ostrich, cassowary, Australian crane, apteryx and Argus pheasant. The ornithology of all parts of the world is represented by the more striking forms. The mammals number 170 and include a group of mounted orangutans, a group of all known genera of marsupials, the Indian elephant, rhinoceros, nylghau, polar bear, and a complete mounted skeleton of a large whale.

During the past year the Museum has acquired through the

generosity of General Wm. J. Palmer the unrivalled collection of Colorado and other birds accumulated during the past thirty-five years by Mr. C. E. Aiken of this city. A selection of these, about one hundred and twenty-five in number, have been mounted for exhibition and are displayed in one of the wall cases on the south side of the Museum. These will be increased as time goes on. The rest of the collection is in the form of skins and is arranged in two large cabinets in the Director's room; it is available for study by any one who wishes to make use of it. All the birds are fully labeled and a complete card catalogue has been prepared.

A commencement has also been made of a collection of Colorado Mammals. In this work the Museum has had the advantage of the co-operation of Mr. E. R. Warren, through whose generosity some seventeen examples of local forms have already been acquired and mounted. These are exhibited in the same case as the Aiken birds.

Mineralogy.—The collection in mineralogy occupies the north side of the room and includes 1,450 specimens of minerals, common, commercial and rare.

Ethnology is represented by a series of casts of skulls and brains of different peoples. The series also contains 125 masks of South Sea Islanders and 25 framed pictures of different races.

Anthropology.—The anthropological department contains a large amount of pottery from Missouri, New Mexico and Peru; the Taos pueblo, Pueblo Bonito, and DeChelly ruins are reproduced in miniature. The Bixby-Lang and Deane collections from the Cliff-dwellings were received through General Palmer. The Bixby-Lang collection was made in Southeastern Utah and Northern Arizona during the years 1897-98. The collection includes almost 500 specimens of pottery, implements, skulls and mummies. The specimens of pottery are exceptionally well preserved. The Deane collection was made in Western New Mexico and includes over 800 specimens of pottery, implements, skulls and idols.

There is also a collection of Egyptian antiquities received from the Egyptian Exploration Society, of which Colorado College is a member.

The following is a list of the principal acquisitions and their donors during the past year:

G. Flower—A spotted Skunk (*Spilogale tenuis*).

Prof. H. Moore—A Scorpion (*Centrurus carolinensis*).

General William J. Palmer—The Aiken collection of Birds, comprising 4,579 examples of 580 species in all, of which 1,976 examples comprising 231 species are from Colorado, and 125 examples of 87 species are mounted for exhibition. Also the humerus and metacarpal bones of an extinct wild Goat from a cave near Glen Eyrie, the type of *Nemorhaedus palmeri* Craigin.

Prof. E. S. Schneider—A collection of Insects mounted in Denton glass tablets chiefly from the neighborhood of Colorado Springs. The collection contains about 300 examples, of these 104 are Butterflies, 170 Moths and 26 Insects of other orders.

W. L. Sclater—A Bat (*Lasionycteris noctivagus*), a Snake (*Eutaenia megalops*), and a Salamander (*Necturus maculosus*).

Mrs. K. Smalley—A Woodpecker (*Dryobates homorus*) from Colorado Springs.

S. S. Stewart—8 Pairs of Shells of a large fresh water Mussel (*Unio undulata*).

Dr. W. C. Sturgis—197 mounted examples of the Mycetozoa of Colorado (See Colo. Coll. Publ. No. 30).

E. R. Warren—17 Colorado Mammals, viz: *Lynx uinta, Sciurus fremonti, Eutamias operarius, E. utahensis, E. consobrinus, Citellus elegans, Cynomys leucurus, Castor canadensis frondator, Neotoma orolestes, N. baileyi, Evotomys galei, Peromyscus truci, P. luteus, P. nasutus, Onychomys leucogaster, Thomomys aureus, Lepus melanotis.* 20 Colorado Birds, viz: *Junco caniceps,* 2 *J. mearnsi,* 2 *J. connectens, Carpodacus frontalis, Spizella ochracea, Otocoris arenicola,* 2 *Leucosticte tephrocotis,* 2 *L. atrata, L. australis,* 2 *Acanthis linaria, Aquila chrysaetos, Bubo pallescens, Nucifraga columbiana, Carpodacus cassini, Cynocephalus cynocephalus.*

Purchased from the Marine Laboratory, Woods-hole, Mass., a collection of typical Marine Animals, thirty-one species in all, belonging to various classes of the Invertebrates.

RELIGIOUS LIFE.

The College is distinctly Christian, and recognizes Christian character as the highest attainment. It is unsectarian in its management. Entering students are asked their denominational affiliations,

and what churches in the city they desire to attend; lists are sent to the pastors of these churches, who seek out the students and bring about them the influence of church homes. Morning prayer is held in the chapel daily, attendance upon whch is required of all students. Every Friday the President discusses questions bearing directly on student life.

Occasional Sunday Vesper services are held in the chapel, conducted by clergymen of various denominations. The Day of Prayer for Colleges is marked by appropriate observance. Weekly prayer meetings on Sunday and Friday evenings are in charge of the student organizations.

The Young Men's and the Young Women's Christian Associations are represented by strong branches, under the auspices of which are conducted mission work at home and abroad, and classes for Bible study. These Associations send delegates to the state and national conferences. The Young Men's Christian Association is under the leadership of a paid student secretary, Mr. Harry E. Ewing.

The Student Volunteer movement is represented. Of the former members of the band, some are continuing in other institutions their preparation for the foreign field, and others are already actively engaged in missionary work.

At the beginning of the College year members of the Associations meet all trains and welcome new students.

STUDENT PUBLICATIONS.

The Tiger, a weekly newspaper, is issued by an editorial board composed of College students. An annual, *The Pike's Peak Nugget,* is published by the Junior class. A *Handbook* of information is issued at the beginning of the College year by the Y. M. C. A.

LITERARY SOCIETIES.

The Apollonian Club, the Pearsons Literary Society and the Ciceronian Club composed of young men, and the Minerva Society, the Contemporary Club and the Hypatia Society, composed of young women, hold weekly meetings for debate and other literary work.

ORATORICAL AND DEBATING CONTESTS.

The Oratorical and Debating Association, of which all students are members, has charge of contests in public speaking. The Association is supported by a voluntary assessment upon the student body. Contests are held each year as follows:

The Freshman-Sophomore prize contest in Declamation is held during Commencement week. Four speakers from each class compete. The first prize is $15; the second, $10.

The Senior-Junior Prize Contest in Oratory is held during Commencement week. Three speakers from each class compete. There are two prizes, the first of $50, the second of $25.

An Intercollegiate Debate with Denver University is held during the second half-year.

Besides these events there is an annual public debate between representatives of the Apollonian and Pearsons Societies.

PHYSICAL TRAINING.

The open climate of Colorado Springs makes outdoor sports possible and attractive throughout the year. Tennis is played all winter, track and baseball practice may be begun as soon as the football season is over. The young men and the young women have separate gymnasia, furnished with shower baths, lockers, etc.

Football, baseball, basketball and track athletics for the men are managed by the Colorado College Athletic Association. The interests of the Association are controlled by a Board, consisting of Mr. Park and Mr. Schneider, from the faculty, Messrs. Hildreth Frost and Donald Tucker, from the alumni, and Messrs. T. D. Riggs and N. C. Morris from the students. Mr. Hildreth Frost is President of the Board, Mr. Schneider is Secretary. The Treasurer of the College acts as Treasurer of the Board.

In 1898 the Athletic Association laid out, at large expense, the Washburn Athletic Field, named in honor of the Rev. Philip Washburn. For this purpose, the natural amphitheatre in the rear of the college buildings, facing the mountains, was used. About five acres of ground were leveled and a grand stand, seating 600, was erected. In 1900 a grand stand, seating 800, was given by Mr. James F. Burns. In 1907 a third stand was built, seating 450. In 1904 a gift of $1,000

from Mr. Charles Washburn, in memory of his brother, the Rev. Philip Washburn, together with a gift from General Palmer, made many further improvements possible. The field contains one football field, two baseball diamonds, a quarter-mile cinder track, and a two hundred and twenty yard straight-away track. For adaptation to its purposes, there is no more complete and satisfactory college athletic field in the West.

Physical Training for the young women is in charge of Miss Mary Helen Woodsmall. All are required to take this work. Special exercises are planned for those whose health does not permit them to enter the general classes. Opportunity is given for out-of-door work. A new hockey field and a special athletic field have been made, providing grounds for basketball, tetherball, running, etc.

PHI BETA KAPPA.

A charter of the Phi Beta Kappa Society was granted to Colorado College in 1904. The object of the Society is the promotion of scholarship and friendship among students and graduates of American colleges. The members of the Society are elected primarily from the best scholars of the graduating classes of the College; secondly from the graduates of the College whose postgraduate work entitles them to such honor; and lastly from any persons distinguished in letters, science, or education. In addition to scholarship, good moral character is required as a qualification for membership.

One-seventh of the regular members of each graduating class in the Liberal Arts department of Colorado College are eligible to election to the Phi Beta Kappa Society at the end of the first half of the Senior year. No student, however, is eligible who does not take his Junior and Senior years in Colorado College, or who has not received a grade-mark of ninety out of a possible one hundred in at least one-half of his college work.

THE COLORADO COLLEGE PUBLICATION.

Under this title are now included the scientific works formerly issued as "Colorado College Studies," as well as the announcements of the various departments of the College, the annual bulletin, the

report of the President, etc. This publication appears every six weeks during the academic year.

The following have been published during 1907:

Science Series:

Vol. XI. No. 50. Notes on the Computation of Logarithms.—*F. H. Loud.*
No. 51. Meteorological Statistics.—*F. H. Loud.*
No. 52. The Palmer Library of Astronomy and Meteorology.—*F. H. Loud.*
No. 53. Oronce Fine: "La Theorique des Cieux et Sept Planetes," published at Paris in 1607.—*Marie A. Sahm.*

Vol. XII. No. 1. The Myxomycetes of Colorado.—*W. C. Sturgis.*
No. 2. Stellar Variability and Its Causes.—*F. H. Loud.*
No. 3. "The Transformation of Algebraic Equations, by Erland Samuel Bring (Lond., 1786)."—Translated and annotated by *F. Cajori.*
No. 4. A Comparison of Temperatures (1906) Between Colorado Springs and Lake Moraine. *F. H. Loud.*

Language Series:

Vol. II. No. 18. The Evolution of Mæterlinck's Dramatic Theory.—*E. C. Hills.*
No. 19. The Development of Blank Verse, 1558-1642. *Priscilla Fletcher.*

General Series:

No. 26. Annual Bulletin of Colorado College.
No. 28. Engineering School of Colorado College.

COLLEGE LECTURE COURSE.

Since 1894 courses of lectures and single addresses have been given in Colorado Springs and other cities in the state. It is the purpose of the College to expand this work, as facilities and opportunities increase.

Following is the programme for 1907-08:

Mr. Dunbar F. Carpenter:

The Origin and Growth of the Jury System.

Professor George I. Finlay:

The Canadian Rockies.
The Nome Gold Fields in Alaska.

Professor E. D. Hale:

The Musical Element in Poetry.
Schubert.

Mr. Frederick R. Hastings:

The Land of the Pharaohs.
The Land of the Prophets.

Professor E. C. Hills:

The Poems of John H. Bryant.

Professor G. M. Howe:

The Grimm Brothers and Their Fairy Tales.

Professor Edward S. Parsons:

The Christian Conquest of England.
The Poetry of Matthew Arnold.

Assistant Professor H. A. Ruger:

How Animals Think and Feel.

Professor E. C. Schneider:

Plant Distribution in the Pike's Peak Region.

President W. F. Slocum:

A Summer Trip to the Polar Regions.

Assistant Professor H. F. Smith:

Sir Thomas More and William Tindale.

Mr. Homer E. Woodbridge:

Stephen Phillips, Poet and Dramatist.

OFFICERS OF THE ALUMNI ASSOCIATION.

Robert M. Work, '03	President
Donald S. Tucker, '06	Secretary
Hildreth Frost, '01	Treasurer

EXPENSES.

Tuition by the year..... $50.00

Students who register for less than eight hours of work pay the usual entrance fees and $10.00 for each half-year course. Any one wishing to attend lectures or recitations without receiving credit upon the College records may secure the privilege of such attendance on the payment of $5.00 for each half-year course.

Matriculation fee $5.00

(From the above named fees there is no rebate in case of withdrawal or dismissal.)

Athletic fee (voluntary)..... $5.00

Board by the half-year in halls (for young women).....$65.00

Board in Hagerman Hall (for young men) by the half-year....$65.00

Board in the short vacations, by the week..... $4.00

Rooms warmed, furnished and lighted, by the year, for each occupant.....$40.00 to $80.00

The number of rooms under $80 is limited. Applications should be made early. Rooms are rented by the year, and will be retained for incoming students only when the application is accompanied by a deposit of $5. This fee will be credited on the bills for room rent, and will be refunded only in case the room is given up by September first.

Young men who room off the campus can obtain rooms at prices similar to those charged by the College.

Students who room in the College residences are required to furnish towels, bed linen and blankets.

Nurse's fee (for young women only: see p. 112)..... $5.00

Fees of College physician:

Office consultation ..... $ .50

Visits to rooms..... 1.00

Infirmary fee (including meals), a day..... 1.00

For prolonged illness and in cases of contagious diseases, a special nurse is employed, and the expenses are charged to the patient.

The following is an estimate of the necessary expenses for the college year (not including matriculation fee, nurse's fee, cost of text-books, laundry, and incidentals):

Tuition, $25 per half-year	$50.00	$50.00
Room rent, $20 to $40 per half-year	40.00	80.00
Board, $65 per half-year	130.00	130.00
	$220.00	$260.00

In addition to these items, fees are charged for the use of apparatus and materials in connection with the following courses (these fees are paid directly to the respective departments at the beginning of each term):

Biology A	$2.50
Biology B	4.00
Biology C(1), D, F, G, or J	3.00
Biology E or K	2.00
Biology C(2) or H	6.00
Chemistry A	7.00
Chemistry B	8.00
Chemistry C or D, each year's work	15.00
Chemistry E or G	15.00
Geology B	3.00
Physics, for each hour's credit	4.00
Physics A, B, or H, book fee	.50

An additional charge of $5.00 is made on the last term bill of the Seniors to cover expenses of graduation.

The bills for tuition, room rent and board are issued at the beginning of each half-year, and are payable immediately. Students who withdraw before the end of the term pay full tuition. Students who withdraw less than six weeks before the end of the term pay full board and room rent. No deduction will be made for short absences during the term. In case of withdrawal more than six weeks before the end of the term half of the room rent and the whole of the amount paid for board for the unexpired portion of the term, will be returned to the student. The date of withdrawal is

reckoned from the time when official intimation of the fact has been received from parent or guardian.

Remittances should be made by draft or money order.

The degree will not be granted to any student whose college bills are not paid before commencement.

SCHOLARSHIPS.

The income of the following scholarships is devoted to the aid of worthy students who may need assistance in completing their course, and who, by their scholarship and character, prove themselves worthy of such assistance:

The Thomas Davee Scholarship of $500, established by the late Mrs. T. V. D. Mitchell, of West Minot, Maine.

The Rice Scholarship of $700, established by friends of the Rev. Chas. B. Rice, D. D., of Danvers, Mass.

The Currier Scholarship of $1,000, founded by the late Hon. Warren Currier, of St. Louis, Mo.

The Edwards Scholarship of $500, given by the Congregational Church of Wellesley Hills, Mass.

The Mary Caroline Quincy Scholarship of $500, given by the late George Henry Quincy, of Boston, Mass.

The Lawrence Myers Scholarship of $1,000, and the Lucy Platt Myers Scholarship of $1,000, given by Mrs. Lætitia M. Myers, of Plainfield, New Jersey.

The Fay Scholarship of $1,000, founded by the late Eliza A. Fay, of Boston, Mass.

A Scholarship of $1,000, given by Mr. William F. Richards, of Colorado Springs, through the Woman's Educational Society of Colorado College.

The Willard B. Perkins Scholarship of $7,000. The second Willard B. Perkins Scholarship of $7,000. These two scholarships were given by the late Willard B. Perkins, of Colorado Springs.

The Hawley Scholarship Fund of the Woman's Educational Society, now amounting to about $10,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships of such young women of the College as the Faculty may recommend, preference being given to daughters of home and foreign missionaries.

The Hawley Scholarship Fund of Colorado College, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., the annual income of which is used in the payment of scholarships for such students of the College as the Faculty may recommend who may be fitting themselves for distinctively Christian work.

The Hawley Memorial Fund, now amounting to about $9,000, founded by the will of Mrs. Mary R. Hawley, of Baltimore, Md., in memory of her husband, Mr. Martin Hawley, the annual income of which is loaned to "worthy and deserving students of the College, as the Faculty may see proper."

The Strettell Memorial Fund of $2,000, given by Mrs. Alma G. V. Harrison, of London, England, and General William J. Palmer, of Colorado Springs, in memory of Mr. Arthur E. V. Strettell, Mrs. Harrison's brother, who died in Colorado Springs in 1882. The income of this fund is to be used to aid students suffering from lung troubles.

The Mary G. Slocum Scholarship of $100 a year, given by the Woman's Educational Society of Colorado College. This scholarship is awarded on the basis of competition to young men of the Junior Class.

The Ruth Danforth Scholarship of $1,000, established by Mrs. Emma Danforth Wiley, of Colorado Springs.

Several other scholarships are supported by annual subscriptions.

Self-Support.—Advanced students of high standing have occasional opportunities for private teaching. Capable and faithful young men can often find work in town. A limited amount of service in Montgomery and Ticknor Halls is offered to young women; this is not often available for first-year students.

PRIZES.

The Hastings Prizes.—The sum of $1,000 has been given by Mr. Frederic R. Hastings, of Colorado Springs, the income of which is to be used in providing prizes for sufficiently creditable theses produced by students in Philosophy K.

THE WOMAN'S EDUCATIONAL SOCIETY.

This Society was formed in April, 1889, by the women of Colo-

rado Springs. Its purpose, as expressed in its constitution, "is to give physical, intellectual and spiritual aid to students in any department of Colorado College." This Society built Montgomery Hall, furnished Ticknor and McGregor Halls, and has been of service in many ways to the College. Its members endeavor to come into personal relation with the students, especially with those who are supporting themselves; they try to find work for them and by friendly advice assist them in their efforts to secure an education. Loans are made on the following conditions:

First—Loans may be made to students who have been in the College for one half-year and are recommended by the Faculty as in every way deserving of such aid.

Second—No student shall be allowed to incur an indebtedness to the Society of more than $300.

Third—Students may receive loans without interest until their connection with the College ceases; after that time their notes shall draw interest at 4 per cent.

For the scholarships within the gift of the Society see pp. 130, 131.

The officers for the current year are:

President—Mrs. William F. Slocum.

First Vice-President—Mrs. Francis W. Goddard.

Second Vice-President—Mrs. L. A. E. Ahlers.

Third Vice-President—Mrs. M. C. Gile.

Recording Secretary—Mrs. W. E. Fette.

Corresponding Secretary—Mrs. Edward S. Parsons.

Treasurer—Mrs. Florian Cajori.

Auditor—Mrs. Priscilla Sater Goodale.

HOSPITAL FUND.

The Trustees of the Bellevue Sanitarium have given to the College nearly $4,000 as the nucleus of a hospital fund for the students.

THE NEEDS OF THE COLLEGE.

Colorado College, never more truly than today, has great and pressing needs. Its growth during the last fifteen years has been steady and rapid, and its friends have generously assisted in helping

to meet its constantly enlarging opportunity. If it is to do the work which legitimately belongs to it and have its part in meeting the educational demands of the great section of the country in which it is located, if it is to provide a thorough and broad training under positive Christian influences for those who are coming to it in constantly increasing numbers, not only from Colorado, but from the entire country, it must have in the immediate future larger resources than those upon which it has been obliged to rely during the last few years.

Among the pressing needs are the following:

General Endowment—For the last ten years the College has been doing a work equal in amount and quality to that done by older eastern institutions possessing a much larger endowment. In consequence each year a deficit has had to be faced. In 1907 an additional fund of $500,000 for endowment was completed. This is needed to pay the actual present running expenses of the College. A much larger sum must be provided if the College is to go forward to fill its place in the educational life of the country.

It is hoped that one form in which this larger endowment will be bestowed is in the provision of permanent funds for individual professorships.

Funds for the Library.—The library has only a few hundred dollars of permanent funds. It must rely for increase upon gifts and upon purchases made out of current expense funds to meet the absolute requirements of the different departments. There is an imperative need first for money to be used at once in the filling of gaps in the material the library already possesses, and also for permanent funds from which additions may be regularly made in accordance with the varied intellectual needs of the College.

Special Funds for Scientific Research.—Money to be devoted to scientific work in special lines is very greatly needed. The opportunities of Colorado College in this direction are unusual, because of the geographical, meteorological and geological situation. The attention of those interested in the advancement of science is earnestly called to this fact..

Funds for the Engineering School.—This department of the College needs a considerable sum of money to be immediately ex-

pended in the proper development of its work, and also a large endowment fund to secure its stability and future growth. Large gifts bestowed for these ends will directly aid in the development of the rich resources of Colorado and the adjoining mountain states.

Y. M. C. A. Building.—Such a center for the life of the young men is urgently needed.

Gymnasium.—A modern gymnasium for young men, thoroughly equipped, and funds to secure a physical director for young men are needed.

Scholarships.—The Trustees desire to emphasize the fact that many young people in a new country are obliged to earn their education by hard and self-denying work. Colorado College still needs a large addition to her scholarship funds. Money thus applied tends directly to the profit of the individual and of the country.

Fellowships.—It would be of great value in developing higher standards of scholarship if several graduate fellowships in various departments could be established.

Infirmary.—The Infirmary in Ticknor Hall, which is available for young women only, is inadequate to the growing needs of the College. There should be provided a separate building, in which contagious diseases can be cared for, as well as ordinary cases of illness. A fund has been started for the endowment of a cot to provide for illness among students who are working their way. Additions to this fund are an urgent need.

FORMS OF BEQUEST.

Those who intend to devise property to Colorado College, or to the Woman's Educational Society, are requested to employ one of the following Forms of Bequest:

"I hereby give, devise and bequeath unto The Colorado College of Colorado Springs, Colorado, the sum of.....Dollars."

"I hereby give, devise and bequeath unto the Woman's Educational Society of Colorado College, of Colorado Springs, Colorado, the sum of.....Dollars."

If property other than money is willed, the form should be correspondingly varied.

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